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Learn2Analyze (L2A)

An Academia-Industry Knowledge Alliance for enhancing Online Training Professionals' (Instructional Designers and e-Trainers) Competences in Educational Data Analytics

Learn2Analyze

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R14. Final Evaluation Report for Learn2Analyze MOOC & Recommendations

Public

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Executive Summary

The scope of **Result 14** (*Final Evaluation Report for Learn2Analyze MOOC and Recommendations*) is to present the final evaluation the Learn2Analyze MOOC including the findings and conclusions from the evaluation study conducted for the overall validation of the Learn2Analyze (L2A) MOOC Phases A and B, and the assessment of the improvements/changes applied after the initial evaluation of L2A MOOC Phase A. This is done through the analysis of (a) pre- and post-course questionnaire-based surveys with the participants of the L2A MOOC, and (b) logged data collected via the platform that implemented and supported the course. The data from Phase A was collected from 03/09/2019 to 14/01/2020 and the data from Phase B was collected from 01/02/2021 (when the enrolment started) to 06/06/2021.

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1. Scope

The scope of **Result 14** (Final Evaluation Report (Phases A and B) for Learn2Analyze MOOC) is to present the findings and conclusions from the evaluation study conducted for the overall validation of the Learn2Analyze (L2A) MOOC Phases A and B, and the assessment of the improvements/changes applied after the initial evaluation of L2A MOOC Phase A. This is done through the analysis of (a) pre- and post-course questionnaire-based surveys with the participants of the L2A MOOC, and (b) logged data collected via the platform that implemented and supported the course. The data from Phase A was collected from 03/09/2019 to 14/01/2020 and the data from Phase B was collected from 01/02/2021 (when the enrolment started) to 06/06/2021 (after the extension of the course).

This document *synopsizes* the major findings and recommendations from the previous evaluation (extensively presented in **Result 13**), *describes* the changes applied in the revised version of the L2A MOOC, *outlines* the evaluation plan, and *presents* the design, implementation, and analysis of the pre- and post-course surveys, as well as the data collected via the implementation platform to conduct the overall evaluation of the L2A MOOC, along with the evaluation outcomes.

2. Background

Learn2Analyze (L2A) (*http://learn2analyze.eu*) is an Academia-Industry Knowledge Alliance for enhancing Online Training Professionals' Competences in Educational Data Literacy, co-funded by the European Commission through the Erasmus+ Program. The key objectives of the L2A initiative are (i) to develop a comprehensive proposal for an Educational Data Literacy Competence Framework (EDL CF) for instructional designers and e-trainers of online and blended learning courses, and (ii) to design, develop, and offer a competence-based Professional Development MOOC accordingly.

Regarding objective (i), the L2A EDL CF was produced and evaluated in **Result 2**, **Result 3,** and **Result 4**. Based on those outcomes, and regarding objective (ii), the initial version of the L2A MOOC was built and consisted of 8 modules combining EDL theory (Modules 2-4) and practice with EDL tools in 3 widely used Course Management Systems, namely, Moodle, the Exact Suite and the IMC Learning Suite (Modules 5-7) following a self-directed MOOC educational design. The content (i.e., syllabus and learning materials) and set-up of the L2A MOOC Phase A are available in **Results 5a**, **6a**, and **7a**.

The initial version of the L2A MOOC was evaluated, and **Result 13** produced a validation report that provided areas of possible improvement of the L2A MOOC Phase A. This was done through pre- and post-course questionnaire-based surveys with the participants of the first phase, conducted from 03/09/2019 – when the enrolment process started - to 14/01/2020 when the MOOC Phase A ended.

3. Synopsis of Evaluation outcomes of L2A MOOC Phase A – Recommendations

To validate the L2A MOOC Phase A and identify areas of possible improvement, pre- and post-course online surveys were designed and distributed among the participants. The surveys aimed to examine

participants' *characteristics* along with their *initial motives* and *background knowledge on EDL* (measured with the pre-course survey), in relation to their perceptions about the *course design* and the *instructional elements*, their *learning experience*, and the *achieved learning outcomes* (measured with the post-course survey), as reported by participants who completed the L2A MOOC Phase A. Learning experience was measured per module and through the course, in terms of the participants' *overall level of satisfaction*, *satisfaction with the platform*, the *workload*, the *level of interaction*, the *content*, and their *continuance intention*. The achieved learning outcomes were measured in terms of *certification*, *dropouts*, and the *advancement of the EDL competence level* of the participants after the completion of the MOOC. The participants' starting competence level for every statement of the EDL CP was measured in the pre-course survey. After the course completion, participants were asked to evaluate their current competence level to reveal the achieved progress.

3.1. Profiles of enrolled participants

L2A MOOC Phase A started on 21/10/2019 and was open until 15/01/2020. During this time frame, 1147 participants from 75 countries answered the pre-course survey and started the MOOC. The majority (86%) came from Europe, mainly from Greece (n=492), Germany (n=220) and Italy (n=110). Most participants (68.87%, n=790) reported that they work in K12 and Higher Education, while fewer (16.83%, n=193) come from Industry/Business, and less from large enterprises (8.98%, n=103) or from SMEs (7.85%, n=90). Only few reported self-employed (5.32, n=61) or not-employed (3.92%, n=45). In particular, 36.53% (n=419) of participants were School Teachers, 29.38% (n=337) were eLearning Professionals, and 11.6% (n=133) were Higher Education Students, with (on average) around 10 years of experience in their professional role, and 7.5 years of experience in online teaching and learning.

3.2. Motives of enrolled participants

Overall, the participants who answered the pre-course survey appeared to be motivated, in terms of goal-orientation, self-efficacy, and self-confidence. Specifically, most participants (66%, n=757) reported that they were "*Planning to follow the course schedule and complete all activities to earn a certificate of completion*", while the reported basic reasons for taking the course were "*To extend my current knowledge of the topic*" or for "*personal development*", characterized as True or Very True by more than 75% of the participants. Participants' estimated GRIT score, i.e., passion and perseverance for long-term and meaningful goals (Duckworth, 2016), was 3.64 (SD=0.615), which is about average. Most participants (62.1%, n=712) reported high self-confidence regarding their *"ability to learn the material in this course*" and most participants (61.9%, n=710) also reported high self-efficacy regarding the "*possibility of finishing this course according to the anticipated time commitment as defined in the syllabus*". Previous studies showed that students who complete MOOCs tend to have high self-efficacy and self-confidence in their ability to complete the course (Wang and Baker, 2015). The statistical analysis revealed that the three targeted groups (eLearning Professionals, Higher Education Students and School Teachers) differ significantly in: (a) reasons for enrolment, (b) GRIT score, (c) Self-confidence, and (d) the hours they intended to spend in the course.

3.3. EDL Competence level of enrolled participants

Finally, participants' average self-reported initial EDL competence level for all dimensions of the EDL CF was characterized as "Advanced beginner" (i.e., level 2). With respect to the targeted job roles (i.e., eLearning Professionals (n=337), School Teachers (n=419), Higher Education Students (n=133)), Higher Education Students reported the lower initial EDL competence level, very close to School Teachers, while eLearning Professionals reported significantly higher EDL level in specific dimensions, namely, Data Collection, Data Application, and Data Ethics dimensions of the L2A EDL-CP.

3.4. Profiles of participants who completed the course

Out of the 1147 participants who answered the pre-course survey and started the MOOC, 244 (21.27%) passed the final assessment, and 235 (20.45%) of them answered the post-course survey to receive their certificate of achievement. A participant had *completed the course* when s/he had received the certificate of achievement (i.e., succeeded the final assessment and submitted both pre- and post-course surveys). Although most participants that completed the course were from Greece (126 participants, 53.62%) followed by Germany (71 participants, 30.21%), the participants from Germany had higher completion rate (30.59%), followed by participants from Ireland (24.14%). With respect to the targeted job roles, eLearning professionals' completion rate (11.87%) is significantly lower than the completion rate of School Teachers (24.34%) and Higher Education Students (36.09%), with participants from the last group having the highest completion rate.

3.5. Motives of participants who completed the course

Additional analysis of the motives of participants who completed the course showed that external motives (e.g., "*To obtain a job-relevant qualification*", "*It would be beneficial for my CV and future job applications*", "*I was advised or ordered to take part in this course*") were positively related to course completion and Higher Education Students had significantly higher mean value (3.13) in external motives than the other two groups. Time scheduling (as part of self-efficacy) also appeared important for the course completion as the analysis showed a strong relationship between the hours per week the participant was planning to spend in the course and the completion rate. Also, it seems that course completion was related to the reported confidence in finishing this course according to the anticipated time commitment as defined in the syllabus. The GRIT score did not differ between the groups.

3.6. EDL Competence level of participants who completed the course

The perceived initial EDL competence level for all dimensions of the EDL CF was "Advanced beginner" (i.e., level 2) and the respective achieved EDL competence level was "Competent" (i.e., level 3). Thus, completing the course resulted to one-level advancement of competences for each EDL competence dimension. In detail, Higher Education Students reported lower achieved level in all dimensions than the other groups, and School Teachers achieved the highest competence advancement. Specifically, significant mean differences for EDL competences between the targeted groups were calculated, and the ANOVA test revealed significant mean differences in competence

advancement only in two EDL dimensions, namely D4 (Data Comprehension and Interpretation) and D5 (Data Application), as well as in the overall EDL competence advancement. Further analysis showed that, although external motives had strong positive relationship to course completion (see section 3.5), external motives had no statistical relation to EDL competence advancement. On the other hand, positive relationships were found between the GRIT score and EDL competences advancement, as well as between self-confidence and EDL competences advancement. The hours that participants were planning to spend in the course were strongly related both to course completion and EDL competences advancement.

3.7. Learning experience of participants who completed the course

Participants' perceived learning experience was measured per module and through the course. The evaluation of the learning experience had three parts: (a) learning experience per module, (b) overall learning experience of the course, and (c) participants' comments regarding their learning experience.

In the post-course survey, participants were asked to rate from 1 to 5 their agreement to 11 statements concerning their learning experience *in each module* of the course. The rating per module varied from 3.5 to 4.4 on average (3=Neither agree nor disagree, 4= Agree, 5=Strongly agree)[1]. The analysis of the responses of the 235 participants who completed the course with respect to the first part revealed strengths and weaknesses per module. Specifically, participants rated high the instructional design of the course (learning objectives clearly stated, variety of content types, and relevance of the assessments with the LOs) across all modules. Statements about the content (learning materials, up-to-date information) were also rated with a high score for modules 2 to 5, whilst instructional videos and comprehensiveness of the content was problematic in modules 6 and 7. Further readings, learning activities, and assessment tasks received relatively low score in all modules and appeared to need attention. Also, the reported workload was evenly spread across modules.

Regarding the evaluation of the overall learning experience, participants were asked to rate from 1 to 5 their agreement to 18 statements concerning their (a) general learning experience, (b) platform ease of use, (c) confirmation of expectations, (d) satisfaction, and (e) continuance intention. Based on the analysis of the responses, most participants rated high the "Platform Ease of Use" (71.9%), as well as dimensions "Confirmation of Expectations" (72.6%), and "Continuance intention" (72.6%). On the other hand, fewer participants appeared satisfied with the level of interaction with peers (38.9%), the course difficulty (54.9%), and the required workload (61.3%), with many of them facing problems. In general, problems were revealed regarding the learning experience throughout the course, mainly related to the workload, the course difficulty, and the lack of interaction and collaboration. Attention appeared to be needed on that one third of participants did not agree with statements related to satisfaction ("*I enjoyed the course*", "*I was motivated to work through the course*"). Yet, all dimensions of the overall learning experience were strongly positively related to EDL competence advancement.

[1] We define the areas of rating as follows: 1. Relatively high (>4), 2. Marginal (3.8 – 4), 3. Relatively low (3.6 – 3.8)

Lastly, participants provided insightful feedback on what they liked most and least in the course, with the platform's ease of use receiving many positive comments. Participants also appreciated their hands-on experience (especially module 5), the multimodal content (highlighting videos as the most engaging learning method), the self-paced nature of the course, and the clearly stated learning goals. The forums were perceived as quite popular for contributing to the interaction with peers in discussing course topics, and several learners commented positively on the final MSQ assessment quiz.

Participants provided negative evaluation on the detailed, quite specialized, and complex content provided for specific LMS, the information overload and the overlaps across modules throughout the whole course, the much higher workload compared to the defined in syllabus, and level of difficulty. Lack of interaction with peers and e-tutors was also reported along with some concerns about the quality of the discussions. Participants also mentioned their concerns about the final assessment, the lack of meaningful feedback on wrong answers, as well as about the questions focusing on content from the three LMSs that was not clearly explained in corresponding modules. Some issues concerning the functioning of the platform were also reported (e.g., some quizzes did not work properly, problems with the navigation through the content, and difficulty to locate posts in the discussion forums).

3.8. Recommendations for improvement

Based on the overall evaluation of the L2A MOOC Phase A, specific areas for improvement were identified and prioritized in the implementation of Phase B. Aiming to address problems concerning (1) the high dropout rates, (2) high demands in workload, (3) participants' low satisfaction level, (4) gaps and overlaps in content and activities, (5) frustration in assessments and lack of insightful feedback mechanisms, (6) poor interaction with peers and e-tutors, the recommended modifications were categorized in five groups: (a) MOOC Content/Activities, (b) MOOC Educational Design: Syllabus, (c) MOOC Educational Design: Assessment for Certification, (d) MOOC Educational Design: Gamification, and (e) Platform. The specific recommendations per category were as follows:

a. MOOC Content/Activities
    - Review and update the content across modules to minimize overlaps and be more concise.
    - Review and avoid detailed, specialized, and complex LMS-related content that users cannot practice, and combine theory to practice.
    - Cross-check videos in specific sections for quality assurance and remove video lectures or interviews longer than 10' as they are considered disengaging.
    - Add self(/Peer)-graded authentic activities at the end of each topic, to enable learners to put theory into practice, boost motivation, and engage them to the content.
    - Use clear grading rubrics to self-grade or peer grade learning activities.
    - Add forum discussions related to human assessed learning activities to enhance collaboration.
b. MOOC Educational Design: Syllabus
    - Revise the overall workload of the course to be distributed in more weeks, extending the course duration to lighten the load of content presented each week.

- Provide guidelines and time scheduling that clearly communicate to the learners how much time should be allocated per each module.

c. MOOC Educational Design: Assessment for Certification

- Revise the final assessment exploiting Use case scenarios to create more authentic assessment activities.

d. MOOC Educational Design: Gamification

- Incorporate and issue competence credential (i.e., competence badge) to the learner for each of the 6 dimensions of the L2A EDL-CF, to provide evidence of their ability and prove their mastery in this competence. To earn the competence credential, the learner needs to achieve all learning outcomes as specified by the respective statements of the dimension.
- Add gamified activities to enhance learners' interaction with content material. These activities could be MCQs related to the video watched or the topic studied providing regular and meaningful feedback to the learners.
- Provide regular feedback with explanations why the required answers in MCQ activities are correct and where to look if wrong answers were selected or provided.
- Add gamification elements like points and progress bar to provide feedback for content and activities completion.
- Add gamification elements (e.g., points, badges) for forum participation to handle isolation, enhance interactivity, support collaboration between peers, and improve social participation.

e. Platform

- Decrease the detailed organization of topics and subtopics, providing a clear learning path.
- Improve navigation and discoverability by using breadcrumb or incorporating a navigation map on top of the screen.

4. Description of actions taken/changes implemented in L2A MOOC Phase B

Overall, and taking into considerations the recommendations from the evaluation of Phase A, the new version incorporated a series of changes described extensively in **Result 5b**, and outlined as follows:

1. *content revision/update across modules* to address issues related to content quality;
2. *self-assessed assignments* based on real-life scenarios to offer deeper understanding of the field;
3. *gamification elements* to offer enhanced engagement in several authentic learning activities;
4. an *upgraded assessment mechanism* leading to *two levels* of Certification of Achievement on Educational Data Literacy (EDL). Level A required the learner to have acquired a basic set of competences for EDL and Level B required demonstration of a higher expertise assessed through hands-on assignments based on simulated practice scenarios.

4.1. Content revision and update

The revised educational design and materials are available in **Result 6b** and have been implemented in the course, whereas the new set-up of L2A MOOC Phase B is described in **Result 7b**. Based on the evaluation outcomes from Phase A, the revised version of the L2A MOOC targeted at the three major job roles, namely the *e-learning professionals* (such as instructional designers and e-tutors) of online and blended courses; the *school leaders and teachers* engaged in blended (using the flipped classroom model) and online (during the COVID19 crisis and beyond) teaching and learning; and the *higher education students* (undergraduates & postgraduates). The L2A MOOC Phase B was designed to combine the *theoretical knowledge* on core issues related to collecting, analysing, interpreting and using educational data, including ethics and privacy, with *practical experience* of applying educational data analytics in three different e-learning platforms (Moodle, eXact Suite, and IMC Learning Suite). All modules (2 to7) were thoroughly revised to address issues related to comprehensiveness, clarity, overlap, and remove content that promotes disengagement (e.g., long videos, irrelevant MCQs). All module revisions went through a rigorous internal review process by two partners of the L2A consortium, to guarantee the advancement in the quality of the produced learning materials.

4.2. Self-assessed assignments

Practising self-assessment is important in the longer term for students' transition from tutor-led learning to independent life-long learning (Nicol & Macfarlane-Dick, 2006). In MOOCs, self-evaluated projects have been found to be accurately evaluated, scoring within just a few points of the gold standard grading, when clear guidance was provided (Wilkowski, Russell, & Deutsch, 2014). In the MOOC context, self-assessed activities were proposed to address issues raised from peer-assessed procedures (Ventista, 2018). Overall, peer-assessed activities in MOOCs can be beneficial for the students when they reflect on and evaluate the work of their peers (Comer & White, 2016) and they promote and support social interaction in the courses. However, peer-assessment and peer feedback have been heavily criticised in MOOCs due to their anonymity (McEwen, 2013), and because they are time-consuming (Meek et al., 2017); they have also received criticism concerning their trustworthiness by the students (Floratos et al., 2015). Nevertheless, social interaction does not have to occur during the process of peer-assessment, as the participants can still interact through peer forums.

In view of the above and taking into consideration (a) the constraints and limitations of the IMC platform (used for the delivery of the L2A MOOC)[2], and (b) the recommendations from Phase A evaluation, a concluding self-assessed assignment was implemented at the end of each module (2 to 7), using rubrics for its assessment, in order to enable participants to put theory into practice, boost motivation, and engage them to the content. In particular, this human-assessed assignment consisted of (a) a real-life scenario activity designed in accordance with a generic Use Case (i.e., a scenario previously described and used as reference to certify the EDL competences of K12 teachers/IDs/ eTutors) to be completed by the participants; (b) a rubric across three proficiency levels for the assessment of the solution – the rubric included the criteria that each response should

[2] They are explained in Result 5b.

meet; and (c) an exemplary solution along with its rating, to be used by the MOOC participants as guidelines for the conducting the self-assessment and as motivation for further self-reflection - for this type of assessment, learners initially practice how to assess responses by grading some example responses and comparing how their grade differs to instructor's grade, using the same rubric. The evaluation of the outcomes was a *mandatory task* to be completed by the participants themselves in the form of self-assessment, using the rubric. In addition, in line with the recommendations, discussion forums related to self-assessed assignments were provided to enhance collaboration, encourage participants to post their thoughts and questions related to the assignment, and promote social interaction.

It needs to be clarified that the self-assessed assignments did not contribute directly the participants' final grades for the L2A MOOC, and they had no participation in order to receive the L2A Certificate of Achievement (Level A and Level B). The participants were recommended to complete them, so as to evaluate their understanding, as well as, to gain points and respective badges (see section 4.3).

4.3. Gamification elements

Gamification in the context of MOOCs, is mainly proposed to enhance motivation to the achievement of the learning goals and to increase the engagement to the learning activities (Romero-Rodríguez, Ramírez-Montoya & González, 2019), but also to support collaboration among participants, handle isolation and improve social participation (Antonaci et al., 2019). Hew et al. (2016) claimed that the use of game mechanics had a positive effect on motivating students to engage with more difficult tasks. Chang and Wei (2016) created a concept map of 40 gamification mechanics in MOOCs and using a survey of 5,000 participants identified the most engaging among them: Virtual Goods, Redeemable Points, Team Leaderboards, Trophies and Badges. Points, badges and leaderboards are the most common gamification elements used in online environments (Dicheva et al., 2015). The key element of gamification is the inclusion of tasks linked to predetermined learning objectives that learners have to perform to accumulate points, move to higher levels, and win awards (Kiryakova et al., 2014).

In the revised version of the L2A MOOC, gamification was implemented both on the content and on the instructional design (structure). For content gamification, the content was altered to be game-like by utilizing gamified activities such as storytelling and feedback loops, in order to enhance learners' interaction with content material, and allowing participants to re-attempt the auto-grading activities. Furthermore, regarding the implementation of structural gamification, and targeting at improving the overall learning experience of the L2A MOOC Phase B participants, stimulating the development of certain competences, and promoting their collaboration and social presence, two approaches of *gamification elements* were implemented: (a) *Experience Points (XPs)* and (b) *Badges*. Gamification in MOOC Phase B aimed to enhance engagement with content and learning activities and promote participation to the discussion forum, previously identified as problematic (section 3.7).

Specifically, in the revised L2A MOOC, XPs were assigned to four categories of experience tracks, namely *Content, Engagement, Test, and Module* and participants could gain and accumulate XPs by

completing respective activities within the MOOC, thus they could reach higher levels in experience tracks. Participants could also monitor their progress via a *Leaderboard*, i.e., a ranking list displayed per experience track. Briefly, the *Content track* shown the participant's progress on course content, and points were gained on text, videos, documents; the *Engagement track* shown the participation in the activities of the course, and points were awarded for completing quizzes, exercises and other interactive learning objects, regardless of the success outcome; the *Test track* shown the progress on tests, and awarded the successful completion of quiz tests with points; the *Module track* shown the progress within modules 2 to 7, and points were awarded when completing a LO within the module. Regarding the awarded *badges*, 6 were Module Badges - one for each module (2 to 7) - and 3 were Community Badges. A Progress bar displayed progress towards next performance level. The *Module Badges*, one for each module (2 to 7) were: (a) Educational Data L2A Finisher, (b) Learning Analytics L2A Finisher, (c) Teaching Analytics L2A Finisher, (d) Moodle L2A User, (e) eXact Suite L2A User, and (f) IMC Learning Suite L2A User. To earn each of these badges, the participant should have gained at least 75% of XP points and should have passed the self-assessed assignment in the respective module. Furthermore, the Community Badges were: (a) L2A Commentator, (b) L2A Moderator, (c) L2A Forum Master. To earn each of these community badges the participant should have posted a certain number of posts in the discussion fora, calculated across all the modules (i.e., Commentator: At least 3 posts, Moderator: At least 10 posts, Forum Master: At least 20 posts).

4.4. Upgraded assessment mechanism

The final assessment mechanism, along with the grading policy and certification were also revised and redesigned. In Phase B, there were two levels of the L2A Certificate of Achievement: Level A Certificate and Level B Certificate of Achievement on Educational Data Literacy. L2A Certificate of Achievement Level A required developing a *basic set of competences* for EDL, and the participants had to gain a mark of 60% or greater overall to the corresponding set of level A 100 multiple choice quiz questions, aiming to assess the understanding of the core concepts presented in the 6 core modules. In addition to that, the L2A Certificate of Achievement Level B required demonstration of a *higher expertise* assessed through hands-on assignments based on simulated practice scenarios. More specifically, for the Certificate of Achievement Level B there was a final concluding assessment where participants were requested to undertake complex tasks through several steps (e.g., by following a use case) and answer a set of 100 Multiple-Choice Questions (MCQs) which were automatically graded by the platform. To gain the Certificate of Achievement Level B, participants should gain a mark of 60% or greater overall to the corresponding set of 100 level B multiple choice quiz questions. Both sets of MCQs were included at the end of the course and participants could complete the MCQ Assessments at any time as there were no 'due dates'. For the successful completion of the course, completing the corresponding MCQs Assessment for Level A and/or Level B Certificate (with 60% success each to obtain both Levels), and completing the Pre-course and the Post-course Surveys were mandatory.

5. Method for evaluation of L2A MOOC Phase B

After the implementation of the interventions described in section 4, enrolments in Phase B of the L2A MOOC started on 01/02/2021 and the course was completed on 06/06/2021 (after the extension). This report presents the evaluation of this version of the course along with the

conclusions from the comparison with evaluation outcomes from the initial version of the MOOC, implemented in Phase A. This section synopsizes the method followed for the evaluation, including the objectives and research questions to address, and the evaluation procedure, including the data collection methods and instruments utilized for this purpose. The section concludes with an overview of the evaluation plan.

5.1. Objectives and Research Question:

The main goals of the evaluation of L2A MOOC Phase B were as follows:

1. **Profile** participants *before they start the course* to understand their general and professional background, their motivation to take the course, their previous experience with gamified elements/features in MOOCs, and their background EDL competence: i.e., *who are our learners?*
2. **Profile** participants *after they have completed the course* to understand what the characteristics of the participants who *actively engaged* in the course are: i.e., *who are the EDL certified learners*?
3. **Associate** those profiles with the overall and per module learning and gamification experience, with the completion of the course, and with the achieved advancement in EDL competence: i.e., *how did our certified learners experience their learning and EDL competence development?*
4. **Explore** the differences in learning experience (per module and overall), gamification experience (per module and overall), and learning outcomes (advancement in EDL competence, completion rate) for the different profiles of participants who completed the course.
5. **Examine** the differences in the successful completion of the course (i.e., advancement in EDL competence, completion rates) in Phase B compared to Phase A: *have the updates in the instructional design (i.e., gamification, self-assessed assignment, upgraded assessment mechanism) and the revision in the content of the course (educational material) affected success?*

Those goals are formulated into the following research question (RQ):

RQ: *What is the effect of the interventions implemented in Phase B (i.e., content revision, gamification, self-assessed assignments, upgraded assessment) on: (a) the learning experience (i.e., engagement, satisfaction, continuance intention) per module and overall; (b) learning outcomes (i.e., competence level advancement, personal goal achievement); and (c) success (i.e., certification, completion rates) of the L2A MOOC, with respect to participants' profiles, regarding the development and acquisition of Educational Data Literacy Competences, as they are described in the L2A EDL CF.*

Based on the evaluation goals, the RQ is further analysed and explored in the following dimensions:

1. What are the individual characteristics of the participants in the L2A MOOC Phase B? What are the main targeted groups of professionals based on their characteristics? What is the motivation, gamification experience, and initial EDL competence of the main targeted participants' groups? Are there any statistically significant differences in those attributes between the targeted groups?

2. What are the characteristics of participants who completed Phase B? Which profiles (in terms of motivation, gamification experience, and EDL competence) are related to the course completion?
3. What is the perceived learning experience per module as reported per profile of participants who completed the MOOC? What is the perceived overall learning experience per targeted group?
4. What is the perceived gamification experience per module as reported per profile of participants who completed the MOOC? What is the perceived overall gamification experience per targeted group?
5. What is the achieved advancement in EDL competence as reported per profile of participants who completed the MOOC?
6. How has the overall learning experience affected the EDL competences advancement?
7. How has the overall gamification experience affected EDL competences advancement?
8. Is the difference in completion rate of Phase B compared to completion rate of Phase A statistically significant?
9. Are there statistically significant differences in the overall learning experience of the participants who completed Phase B compared to participants who completed Phase A?
10. Are there statistically significant differences in the EDL competence advancement of the participants who completed Phase B compared to participants who completed Phase A?

5.2. Evaluation Procedure

The procedure to conduct the evaluation of L2A MOOC Phase B and address the research question included the following steps:

- Set-up the evaluation plan – how the MOOC will be evaluated (what dimensions/aspects of the course, what data will be collected and analysed, how results will be used, etc.);
- Define the evaluation design: pre-post course and between phases design;
- Define the data sources to be utilized and the data collection methods: surveys and log files from the IMC platform (in which the course was implemented);
- Design and develop the tools for data collection: the invitation letter, the consent form, the pre- and post- course surveys – clarify what logged data from IMC platform will be utilized;
- Clarify privacy and ethics issues (how consent was obtained and how ethical obligations to participants were met);
- Use statistical methods to process and analyze the collected data;
- Interpret the results (what it means for the program) and synthesize the findings in a report.

5.3. Data collection instruments

The pre-course survey consisted of the three parts: the invitation letter, the consent form, and the questionnaire itself. The survey was a web-based form (Google form), including the following:

Invitation Letter	• Inviting to participate • Informing about the objectives • Guiding survey's completion • Guiding receipt and usage of code to unlock L2A MOOC content (**Unique Code ID –** guidelines to create and provide this code to match participants' pre- and post- course survey answers)
Consent form	Following the guidelines of the General Data Protection Regulation (EU) 679/2016 (GDPR), informing about: • Purpose and procedure • Potential benefits, risk, or discomforts • Data storage and transfer outside the EU • Right to withdraw • Rights of research participants • Participant concerns and reporting • Conflict of interest, compensation, anonymity, confidentiality • Usage, debriefing and dissemination of results Participants either agree or not to the consent form and the survey.
Questionnaire	To collect responses of participants, the questionnaire was structured into five (5) sections: **1. Demographics & General Background** • Year of birth • Gender • Country of residence • Highest level of education completed • Current job sector • Definition of professional role – selecting from a given list • Years involved in this role • Years involved in the field of Digital Teaching and Learning • English proficiency • Comfort with technology • Number of MOOCs enrolled in the past • Number of MOOCs completed **2. Gamification** • Familiarity with gamification in teaching and learning • Experience with gamified learning in the past • Number of gamified MOOCs taken part • Use of gamification in educational design of participants • Attitude towards Gamification - rating one (1) statement from "Not at all true" to "Very True" plus a "Not applicable" choice • Gamification User Types based on Hexad Scale (24-item scale) – rating the agreement to 24 statements in a 7-point Likert scale, from "Strongly Disagree" to "Strongly Agree" **3. Motives for enrolling in the L2A MOOC**

	• Goal in taking the course - selecting from 7 statements or providing alternative answer • Reason for enrolment - rating 8 statements from "Not at all true" to "Very True" plus a "Not applicable" choice • Self-confidence about learning the course material – rating a 5-point Likert scale • Possibility of course completion according to defined by the syllabus time commitment – rating a 5-point Likert scale • Hours per week planning to spend on the course • User Intention Ratio – the percentage of the course intending to be completed • Certificate Level targeting • 8-item GRIT scale – passion and perseverance for long-term and meaningful goals rating from "Very much like me" to "Not at all like me" **4. Existing Competence Level per L2A EDL-CP Statement –** rating the initial competence level of total 17 statements from the 6 EDL Competence Dimensions with five (5) possible options: Novice, Advanced Beginner, Competent, Proficient, Expert **5. Unlocking L2A MOOC content instructions** Participants needed approximately 25 minutes to respond to the sets of closed type questions that were mentioned above using the Likert scale.

Similarly, the post-course survey consisted of three parts, including the invitation letter, the consent form, and the questionnaire itself, and again, was a web-based form (Google form), as follows:

Invitation Letter	• Inviting to participate • Informing about the objectives • Guiding survey's completion • Guiding receipt and usage of code to unlock L2A MOOC Certificate of Achievement (Level A and/or Level B)
Consent form	Following the guidelines of the General Data Protection Regulation (EU) 679/2016 (GDPR), informing about: • Purpose and procedure • Potential benefits, risk, or discomforts • Data storage and transfer outside the EU • Right to withdraw • Rights of research participants • Participant concerns and reporting • Conflict of interest, compensation, anonymity, confidentiality • Usage, debriefing and dissemination of results Participants either agree or not to the consent form and the survey.
Questionnaire	To collect responses of participants, the questionnaire was structured into six (6) sections.

	1. **Learning experience per module –** rating 13 statements about the learning experience for every module separately from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) 2. **Overall learning experience** • Learning Experience – rating the agreement to 7 statements from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) • Platform Ease of Use - rating the agreement to 5 statements from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) • Level A Certificate assessment – rating the agreement to 2 statements about the difficulty level from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) • Level B Certificate assessment – rating the agreement to 3 statements from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) • Satisfaction – rating the agreement to 2 statements from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) • Confirmation – rating the agreement to 2 statements from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) • Continuance Intention – rating the agreement to 2 statements from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) • Positive & Negative comments – answering 2 open-ended questions about what participants liked & disliked to the course 3. **Overall Gamification Experience** • Satisfaction, Enjoyment, Motivation, Autonomy, Competence (of Gamification Experience) – rating the agreement to 13 statements from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) • Accomplishment, Guided, Social Experience, Competition, Challenge (of Gamification Experience) – rating the agreement to 14 statements from "Strongly Disagree" to "Strongly Agree" "Strongly Disagree" to "Strongly Agree" (5-point Likert scale), based on Gameful Experience Questionnaire (GAMEFULQUEST). • Usefulness – rating the agreement to 4 statements from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) • Attitude towards Gamification - rating one statement from "Not at all true" to "Very True" plus a "Not applicable" choice 4. **Gamification Experience per Element –** rating the agreement to 10 statements from "Strongly Disagree" to "Strongly Agree" (5-point Likert scale) for each gamification element separately (Points, Badges, Levels, Progress Bar, Leaderboard) 5. **Achieved Competence Level per L2A EDL-CP Statement -** rating the achieved competence level of total 17 statements from the 6 EDL Competence Dimensions with possible options: Novice, Advanced Beginner, Competent, Proficient, Expert 6. **Unlocking L2A MOOC Certificate of Achievement instructions**

	Participants needed approximately 30 minutes to respond to two (2) open-ended questions and to the sets of closed-ended questions that were mentioned above using the Likert scale.

Details about the pre- and post-course surveys can be found in **Appendix A - Instruments**.

Data and analytics from the IMC platform (per module – if applicable – and for the whole course, per participant who completed the course):

Engagement & Gamification	• Experience points per track (*Content, Engagement, Test, and Module*) • Badges (*Module, Community*)

6. Results

6.1. Analysis of Participants' Profiles

Learn2Analyze MOOC Phase B started on 01/02/2021 and was open until 06/06/2021. During this time frame, 2971 participants were registered. From these, 2880 accounts were activated, 2204 registered users enrolled in Module 1, and 1254 participants answered the pre-course survey and started the MOOC. We consider that the enrolled user has "started the MOOC" only if s/he submits the Pre-course survey to unlock Modules 2-8. After removing the duplicates based on the unique code and email, 1249 unique responses were encountered and further analysed. Table 1 synopsizes the enrolments.

Table 1: Enrolments

Enrolled users	Frequency	Percentage
Started the MOOC: Enrolled users that submitted the pre-course survey	1254	42.21
Registered but never activated their account	91	3.06
Enrolled in the MOOC but never accessed Module 1	676	22.75
Started Module 1 but dropped without Pre-course	950	31.98
Total	**2971**	**100**

6.1.1. Participants' Profiles as per pre-course enrolment

6.1.1.1. Generic profiles of participants who enrolled in the course

Three categories of demographic elements were used to describe the generic profiles of participants**:** a) general: age, gender, and country of residence; b) background knowledge: educational qualifications and experience with MOOCs, English, and technology; and c) professional experience.

a) General

Specifically, in L2A MOOC Phase B, participants' mean age was 42.8 years (normally distributed with std. deviation=10.64 – Table 2 & Figure 1), with the majority of them being females (65.7%, N=820), while the male participants being half of the female ones (32.8%, N=410) (please, see **Appendix B.1**).

Table 2: Descriptive statistics of participants' age

Statistics – Age

age

N	Valid	1249
	Missing	0
Mean		42.82
Median		44.00
Std. Deviation		10.640
Percentiles	25	36.00
	50	44.00
	75	51.00

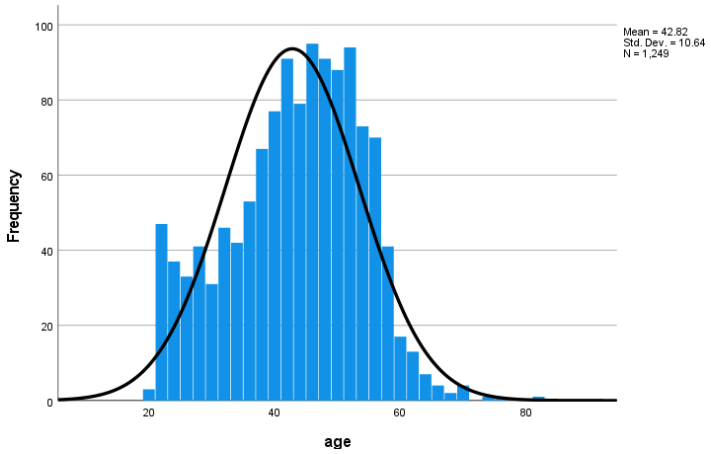

Figure 1: Distribution of participants per age

The 1249 participants came from 69 countries, with most of them originating from Greece (60.0%, N=750), while fewer were from Germany (13.1%, N=164), and less from Italy (7.3%, N=91).

Figure 2: Participants' geographical distribution

The participants' geographical distribution is illustrated in Figure 2 and their distribution per country of residence is synopsized in Table 3 (for the full list of geographical distribution, please see **Appendix B.1**).

Table 3: Synopsis of distribution of participants per country of residence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Greece	750	60.0	60.0	60.0
	Germany	164	13.1	13.1	73.1
	Italy	91	7.3	7.3	80.4
	Ireland	27	2.2	2.2	82.6
	United Kingdom	21	1.7	1.7	84.3
	France	20	1.6	1.6	85.9
	Other	176	14.1	14.1	100.0
	Total	1249	100.0	100.0	

b) Background knowledge

With respect to their educational background and their overall educational profiles, 56.4% (N=705) of participants hold a Master's Degree, while 18.7% (N=234) hold a Bachelor's Degree, 11.6% (N=145) have acquired a Doctoral Degree, and fewer are the participants who have higher academic qualifications (2.3%, N=29). Furthermore, 70% (N=874) of the participants reported high (N=442) or very high (N=432) level of proficiency in English (M=3.99., SD=0.915), and the reported comfort with technology was even higher, with 80.5% (N=1005) participants claiming high (N=502) or very high (N=503) comfort (M=4.18, SD=0.799) respectively. Participants also report a moderate previous involvement and experience with MOOCs, with 55.1% (N=688) having enrolled in at least 2-4 MOOCs in the past, and 48.6% (N=607) having completed the MOOCs they have enrolled in. On average, the participants reported that they have enrolled in 3.53 MOOCs and they have completed 2.98. The participants who have never completed a MOOC before were also many (38.3%, N=478), with most of them, however, having no previous involvement or experience with MOOCs at all (76.2%, N=369). For the full descriptive statistics of background educational qualification, please see **Appendix B.1**.

c) Professional experience

With respect to their current job sector, 67.7% (N=845) of the participants reported that they work in K-12, University, or College, while 11.3% (N=141) come from Industry/Business (Small/Large –

for/non -profit), 9.8% (N=122) were reported as Self/Not-employed, and 11.3% (N=141) work somewhere else.

To gain a better understanding of participants' professional roles, they were asked to describe their role by selecting multiple answers from a list. Next, the responses were coded by grouping similar choices in seven (7) generic categories, illustrated in Figure 3. The coding of professional roles into groups is summarized in **Appendix B.1**. It becomes apparent that participants are distributed in three prevailing groups of professionals, namely School Teachers (49.8%, N=622), eLearning Professionals (17.0%, N=212), and Higher Education Students (11.7%, N=146). The rest 269 participants (21.5%) belong to smaller clusters of professionals, and in the following analysis will be treated as "Other".

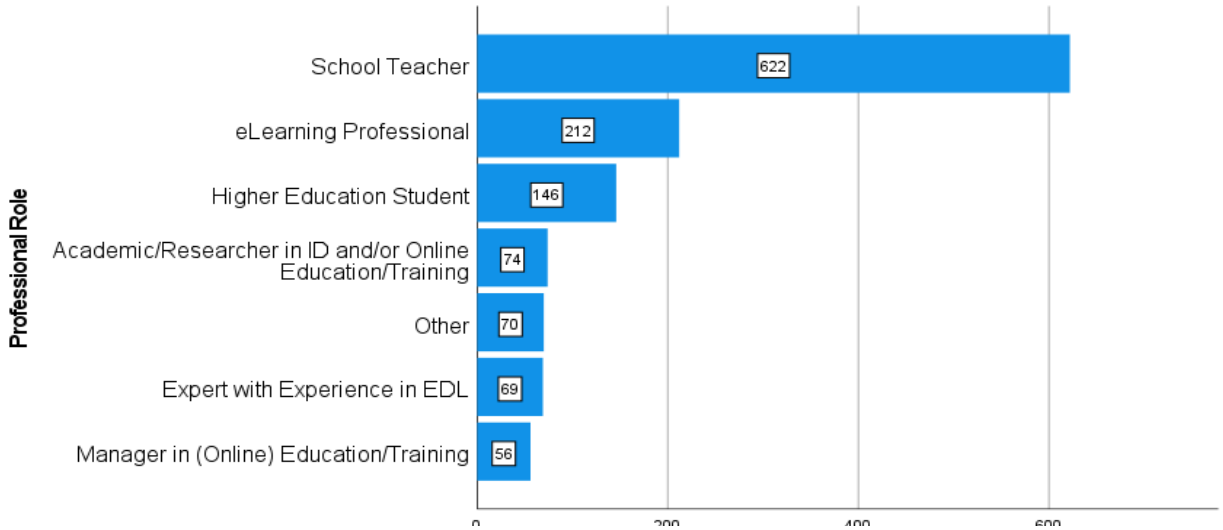

Figure 3: Distribution of participants per professional role

Table 4 demonstrates the participants' current job sector in relation to their reported professional role. Participants reported 12.26 years of experience in professional role and 6.96 years of experience in online teaching and learning (in average). Specifically, School Teachers have 16.83 (SD=6.941) years of professional experience, eLearning Professionals have reported a mean of 8.12 (SD=6.713) years in the professional role, and Higher Education Students have – as expected – the lower experience with a mean of 4.99 (SD=5.042) years. Details about the distributions of years of professional experience and experience in online education can be found in **Appendix B.1**.

Table 4: Distribution of participants per job sector and professional role

			Professional Roles (Groups)				
			eLearning Professional	Higher Education Student	School Teacher	Other	Total
Job Sector (Groups)	K-12, University, College	Count	66	92	554	133	845
		% of Total	5.3%	7.4%	44.4%	10.6%	67.7%
	Industry	Count	79	10	4	48	141
		% of Total	6.3%	0.8%	0.3%	3.8%	11.3%
	Not-employed/ Self-employed	Count	38	36	12	36	122
		% of Total	3.0%	2.9%	1.0%	2.9%	9.8%
	Other	Count	29	8	52	52	141
		% of Total	2.3%	0.6%	4.2%	4.2%	11.3%
Total		Count	212	146	622	269	1249
		% of Total	17.0%	11.7%	49.8%	21.5%	100.0%

6.1.1.2. Motivational profiles of participants who enrolled in the course

In line with L2A MOOC Phase A, in Phase B four motivational aspects were examined as dimensions of participants' profiles: a) their goals in taking the course; b) the reasons for enrolment; c) their GRIT score (i.e., passion and perseverance for long-term and meaningful goals); and d) self-confidence.

a) Goals

Participants were asked to define their goal in taking the course from a list of possible answers. Most participants (67.3%, N=841) answered they were "*Planning to follow the course schedule and complete all activities to earn a certificate of completion*". Other common goals were "*Auditing, but intend to follow the course schedule*" (7.8%, N=98) and "*General curiosity*" (7.2%, N=90) (**Appendix B.1**).

b) Reasons for enrolment

Participants were asked to rate from "*Not at all true*" (1) to "*Very True*" (5) their agreement in 8 statements regarding the reasons for taking the course. The option "Not applicable" was also available. Figure 4 shows the mean of participants' ratings per statement.

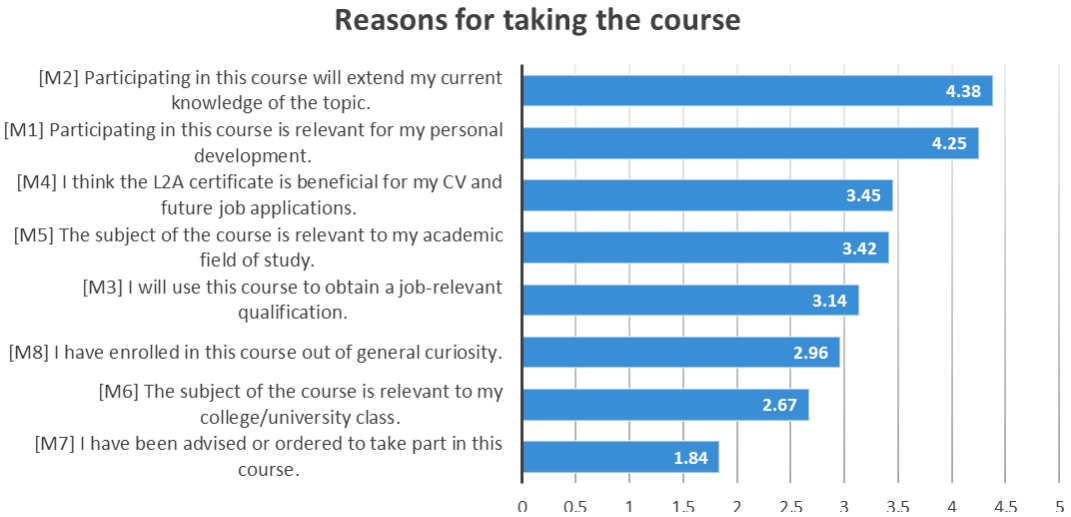

Figure 4: Mean ratings per reasons for enrolment

Most participants agreed that taking the course *"[M2] To extend my current knowledge of the topic*" (84.95%, N=1061) and for "*[M1] personal development*" (76.78%, N=959) were the most important reasons for enrolment, rating those statements as "*True*" or "*Very True*". Significantly less participants (16.49%, N=206) enrolled because they were "*[M7] Advised or ordered to take part in the course*".

c) GRIT score

The short-grit scale consists of 8 statements (GRIT1 – GRIT8), describing the person's ability to persist in something the person feels passionate about, and to persevere when the person face obstacles (Duckworth, 2016). The statements can be found in **Appendix B.1**. The rating of the statements is on a Likert-like scale from 1 (Not like me at all) to 5 (Very much like me), with statements GRIT1, GRIT3, GRIT5, and GRIT6 being rated in reversed (R) scale. To calculate the GRIT Score, we added the points on all statements and divided by 8. The maximum score could be 5 (extremely gritty) and the lowest could be 1 (not at all gritty). The GRIT score of the participants who

answered the pre-course survey in Phase B was moderate with a mean value of 3.19 (SD=0.468). Descriptive statistics per GRIT statement, and the overall GRIT distribution can be found in **Appendix B.1**.

d) Self-confidence

The average participants' self-confidence to learn course material, as well as the anticipated time-commitment on the course on a weekly basis were also moderate (M=3.53, and M=3.76 respectively). In the question "*How confident are you in your ability to learn the material in this course?*", 54.5% (N=681) answered "*Very confident*" and "*Extremely confident*", while in the question "*How would you rate your possibility of finishing this course according to the anticipated time commitment as defined in the syllabus?*", 63.7% (N=795) answered "*Very confident*" and "*Extremely confident*". Participants reported that they were planning to allocate 4.23 hours on the course per week on average. Specifically, most of the participants reported a time-allocation of either 3-4 hours (39.1%, N=488) or 5-6 hours (23.5%, N=293) on the course on a weekly basis (see **Appendix B.1**).

6.1.1.3. EDL Initial Competence of participants who enrolled in the course

In the pre-course survey, participants self-evaluated their perceived initial EDL competence level, from Novice (1) to Expert (5). As shown in Figure 5, the initial EDL competence level for all dimensions was approximately 2=*Advanced beginner*. The complete statistics (mean, standard deviation) for all dimensions of participants' initial EDL competence level can be found in **Appendix B.1**.

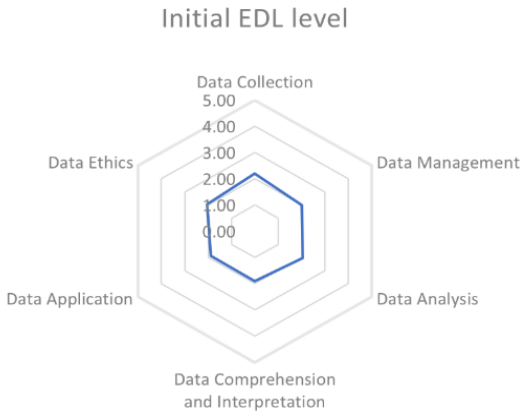

Figure 5: Initial EDL Competences Profile

6.1.1.4. Gamification profiles of participants who enrolled in the course

Since gamification was a major intervention in L2A MOOC Phase B compared to Phase A, the gamification profiles of the participants who enrolled in the course were also studied, and three basic aspects were examined: a) previous experience with gamification; b) attitude towards gamification; and c) gamification user types (based on personality traits – and player types, in line with Tondello et al. (2016) who created and validated the Gamification User Types Hexad Scale, a 24-items survey response scale based on Marczewski's (2015) Gamification User Types Hexad framework).

a) Previous Experience with Gamification

Most of the participants (61.6%, N=770) were familiar with gamification in teaching and learning so far, and half of the participants (50.6%, N=632) reported that they had experienced gamification in

learning context before. Many participants (44.8%, N=560) reported that they have used gamification in their educational design. However, most of the participants (71.4%, N=892) had never enrolled in a gamified MOOC in the past. Those responses are illustrated in Figure 6.

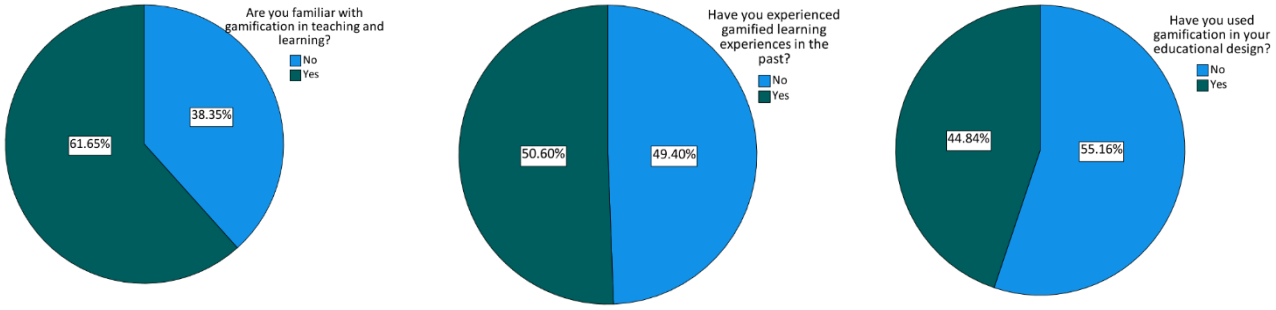

Figure 6: Previous experience with gamification

b) Attitude towards Gamification

Overall, participants had a favorable attitude towards gamification, with a mean of 3.99, and most of them (68.4%, N=854) rated this statement either as True or Very true. Although there was an option "Not Applicable", only 29 participants selected it. Detailed statistics can be found in **Appendix B.1**.

c) Gamification User Types

Participants were asked to rate their agreement in a 7-Likert like scale to 24 statements to find out which gamification user type characterizes them. Many participants were characterized by more than one type as they scored equally in them, i.e., Multitype (38.03%, N=475). Considering all types that a participant belongs to, 53.48% of the participants (N=668) belong to Philanthropists, 32.75% (N=409) are characterized as Socializers, 32.03% (N=400) are Achievers, and/or 31.06% (N=388) are in the type of Free Spirits. Descriptive statistics per Gamification User Type are available in **Appendix B.1**.

Furthermore, after classifying the participants with multiple gamification user types as "Multitype", the distribution of participants in the different types is illustrated in Figure 7. The prevailing type is the Philanthropist (24.0%, N=300), followed by the Free Spirit (12.9%, N=161), Achiever (10.9%, N=136), and Socializer (10.5%, N=131). The types of Player and Disruptor were less represented in the participants' sample (3.0%, N=37 and 0.7%, N=9 respectively).

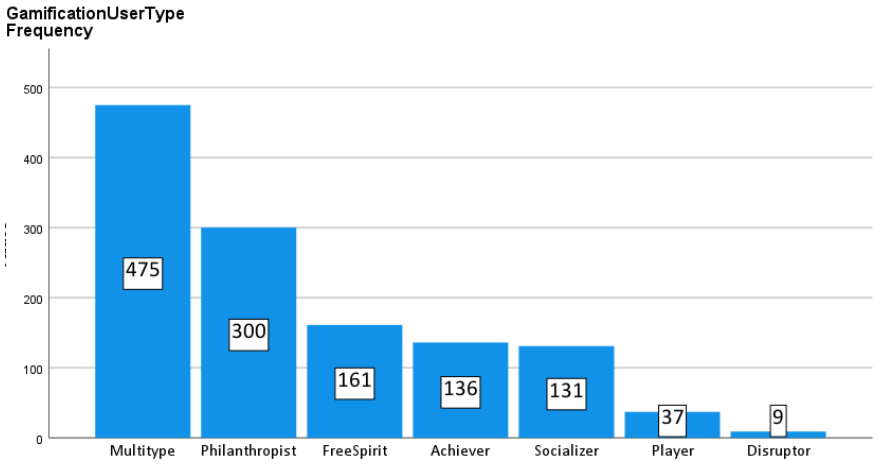

Figure 7: Distribution of Gamification Users Types

6.1.1.5. Participants' profiles per targeted group

As explained in Section 6.1.1.1.c, most participants belong to three major professional roles, namely School Teachers (49.8%, N=622), eLearning Professionals (17.0%, N=212), and Higher Education Students (11.7%, N=146), whereas the rest were categorized in Other (21.5%, N=269).

Here, the differences in the profiles of those targeted groups are examined, following an approach similar to the respective one for the general sample: a) demographic characteristics; b) motives and reasons for enrolment in the course; c) initial EDL Competence level; and d) gamification profiles.

a) General

With respect to the participants' gender, 72.03% (N=448) of the School Teachers, 51.89% (N=110) of the eLearning Professionals, and 72.60% (N=146) of the Higher Education Students, were females.

Table 5: Mean age per targeted group

ProfRolesGroups	Mean	N	Std. Deviation
School Teacher	46.04	622	7.880
eLearning Professional	43.71	212	11.037
Higher Education Student	28.25	146	8.800
Other	42.61	269	10.260
Total	42.82	1249	10.640

Mean and standard deviation for the age of participants were calculated for the major targeted groups (Table 5). As expected, the Higher Education Student is the youngest sub-group (M=28.25, SD=8.800), whilst the School Teacher group is the oldest one (M=46.04, SD=7.880).

Mean and standard deviation for the years of experience in professional role as well as for the years of experience in digital teaching and learning were calculated for the targeted groups. Table 6 illustrates the distribution of the years of experience and the years of experience in digital teaching and learning per targeted group. One-way ANOVA revealed that the differences in mean professional experience between the groups (in years) is statistically significant ($F(3, 1245)= 204.395$, $p = 0.000$), confirming that School Teachers have significantly higher experience than eLearning professionals and Higher Education Students. Similarly, the mean and standard deviation of years of experience in digital teaching and learning per targeted group, were statistically significantly different ($F(3, 1245)= 16.679$, $p = 0.000$), where School Teachers reported significantly longer experience in digital education than the other two groups, and Higher Education Students reported the less experience in this domain, respectively. The complete ANOVA results can be found in **Appendix B.2**.

Table 6: Distribution of participants' years involved in their professional role and in digital education per targeted group

		Professional Experience		Experience in Digital Education	
ProfRolesGroups	N	Mean	Std. Deviation	Mean	Std. Deviation
School Teacher	622	16.8344	6.94091	7.1318	5.99667
eLearning Professional	212	8.1179	6.71334	8.0825	6.47811
Higher Education Student	146	4.9863	5.04222	3.9418	2.66103
Other	269	8.8736	6.86890	7.2937	5.70686
Total	1249	12.2554	8.16595	6.9552	5.84156

b) Motivational profiles

All three groups of participants reported, at a rate of 56.6% and higher, that their goal in taking the course is *"… to follow the course schedule and complete all activities to earn a certificate of*

completion" (**Appendix B.2**). In addition, according to the mean rating of the 8 statements expressing the reasons for enrolment (M1 – M8), most participants from each targeted group agreed that taking the course *"[M2] To extend my current knowledge of the topic*" and for "*[M1] personal development*" were the most important reasons for enrolment, rating those statements as "*True*" or "*Very True*".

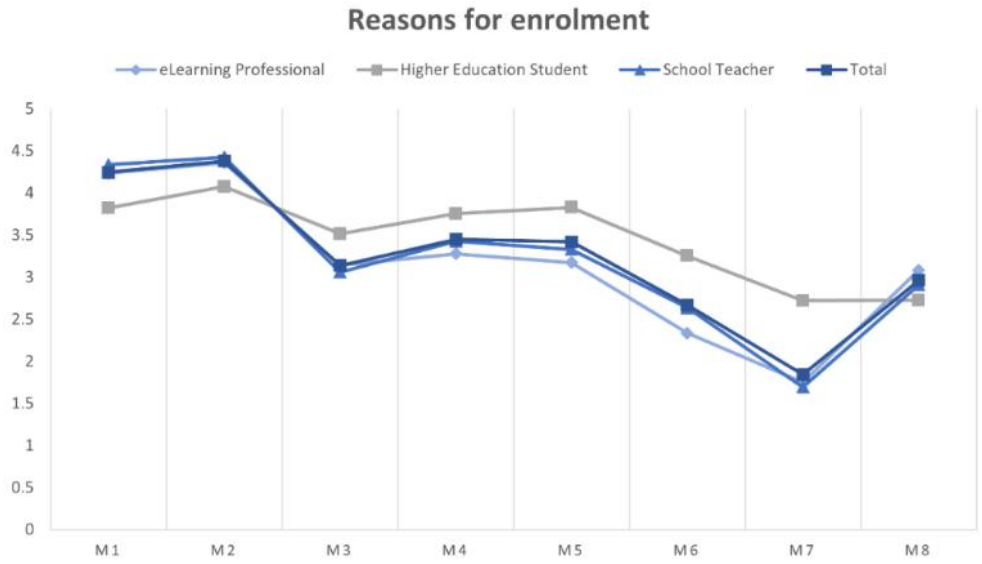

Figure 8: Difference in reasons for enrolment per targeted group

Significantly less participants enrolled because they were "*[M7] Advised or ordered to take part in the course*" (**Appendix B.2**). Figure 8 illustrates the reasons for enrolment per targeted group and for the whole (total) sample: eLearning Professionals and School Teachers have more similarities in the criteria/reasoning for enrolment, while Higher Education Students' motives are somewhat different.

The ANOVA test (**Appendix B.2**) revealed statistically significant differences in the means of reasons M1-M7 between the groups, but not for "*[M8] ...general curiosity*" ($F(2, 977)= 2.266$, $p = 0.104$). Thus, to further investigate those differences, the Independent samples t-test between the couples of professional roles (i.e., School Teachers and eLearning Professionals, Higher Education Students and eLearning Professionals, and Higher Education Students and School Teachers) revealed the following:

a) there is no statistically significant difference between eLearning Professionals and School Teachers for M1, M2, M3, M4, M5, M7, and M8, while School Teachers report higher mean rating in reason M6.

b) there is statistically significant difference between eLearning Professionals and Higher Education Students for all M1 – M8, with Higher Education Students reporting statistically significantly lower rating in M1, M2, and M8, and statistically significantly higher rating in M3, M4, M5, M6, and M7.

c) there is no statistically significant difference between School Teachers and Higher Education Students for M8, while Higher Education Students reported statistically significantly lower rating in reason M1 and M2 and statistically significantly higher rating in M3, M4, M5, M6 and M7.

For complete t-test results, please see **Appendix B.2**.

The motives can be further grouped in internal and external. Specifically, internal motives include

statements M1, M2, M5, M6, and M8, while external motives include statements M3, M4, and M7[3]. Based on this classification of motives, the mean values of internal/external/total motives per targeted group were computed and statistically compared (**Appendix B.2**). The comparison of mean rating showed that external motives score significantly higher among Higher Educational Students compared to eLearning Professionals and School Teachers. This result is visualized in Figure 9 which displays the mean values for internal and external motives per targeted group. It becomes apparent that there are not significant differences in the internal motives between the three groups, whereas Higher Education Students reported different external motives for enrolment.

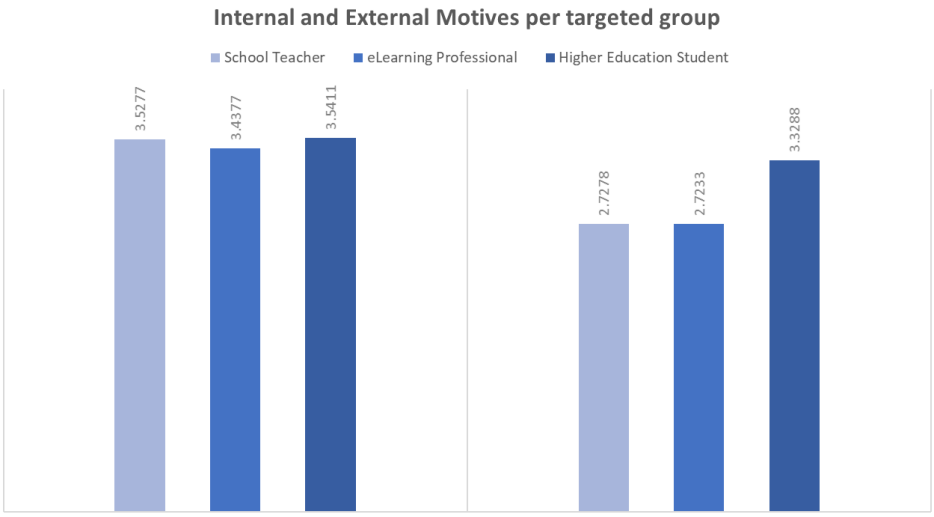

Figure 9: Internal and External motives per targeted group

Another parameter of the motivational profiles is the GRIT score which – as explained in the previous section – is a measure for the tendency to sustain interest in and effort toward very long-term goals. It is calculated through an 8-items (GRIT statements) scale, where participants rate themselves from "*Not at all like me*" to "*Very much like me*". The comparison of mean GRIT scores per targeted groups showed that eLearning Professionals and Higher Education Students report similar scores (M=3.23, SD=0.463 and M=3.24, SD=0.481 respectively), while School Teachers score somewhat lower (M=3.15, SD=0.449). Figure 10 visualizes this result. The complete statistics can be found in **Appendix B.2**.

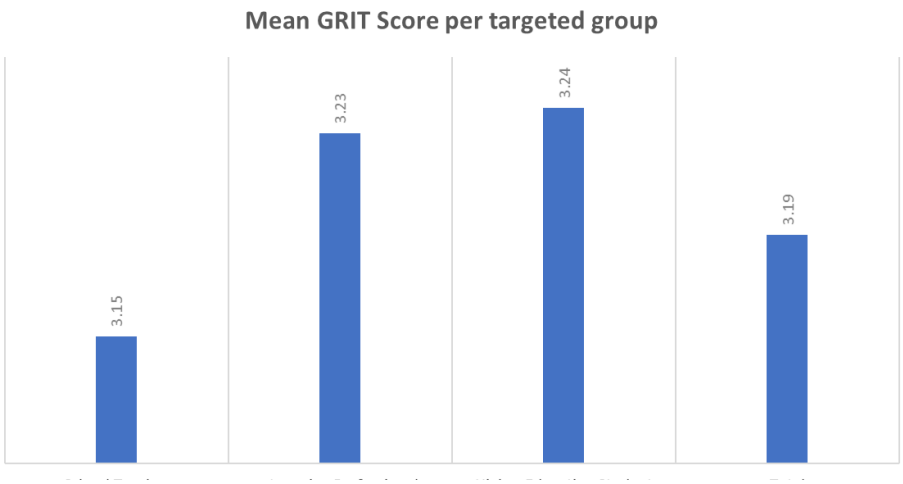

Figure 10: Mean GRIT score per targeted group

[3] Internal Motives = (M1 + M2 + M5 + M6 + M8)/5; External Motives = (M3 + M4 + M7)/3

In addition, the comparison of means in self-confidence of participants per targeted group revealed statistical differences in their perceived ability to learn material in the course, as well as in their perception of finishing the course according to the anticipated time commitment as defined in syllabus. Higher Education Students are less confident in learning material and School Teachers are more determined to remain committed to the anticipated time to complete the course. No statistically significant differences were detected per targeted group with respect to the hours planning to spend in the course, with a mean value of approximately 4.3 hours, while the recommended time from the L2A MOOC Phase B designers was 8 hours per week. The complete ANOVA results can be found in **Appendix B.2**. Figure 11 illustrates the per targeted group self-confidence on the above terms.

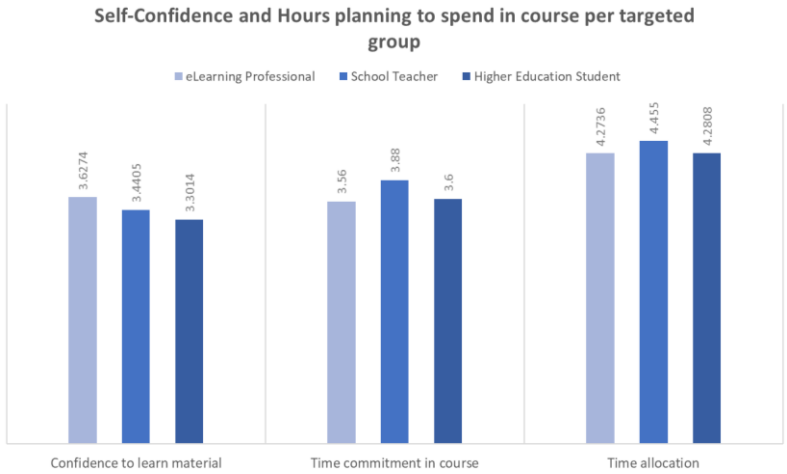

Figure 11: Self-confidence and hours planning to spend in course per targeted group

c) EDL Competence level

The mean initial EDL competence level per dimension per targeted group is illustrated in Figure 12. Overall, eLearning Professionals have reported slightly higher competence in [D3] Data Analysis, [D4] Data Comprehension and Interpretation, [D5] Data Application, and [D6] Data Ethics; School Teachers appear to have higher competence in [D1] Data Collection and [D2] Data Management; Higher Education Students reported the lowest competence level in all dimensions. The statistical analysis (ANOVA) shown not statistically significant difference between those groups (see **Appendix B.2**).

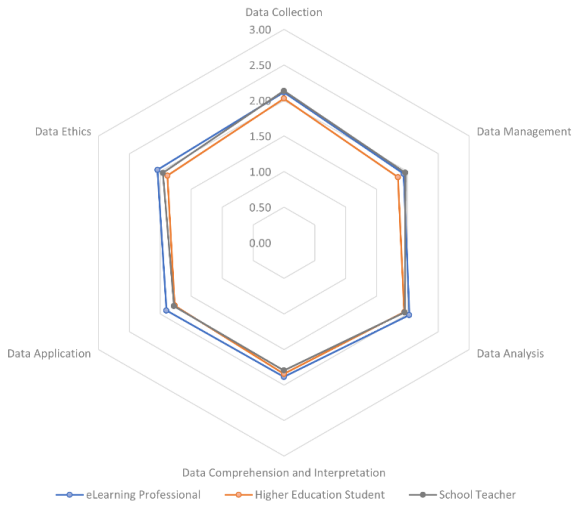

Figure 12: Initial EDL Competence level per targeted group

Additional Independent samples t-tests between the couples of targeted groups (i.e., School Teachers and eLearning Professionals, Higher Education Students and eLearning Professionals, and Higher Education Students and School Teachers) confirmed that there are no statistically significant differences in the initial EDL competence level in any dimension between the groups (**Appendix B.2**).

d) Gamification profiles

To create the gamification profiles of the targeted groups, their previous experience with gamification, their attitude towards gamification, and the gamification user types were examined. Specifically, most of the School Teachers (58.7%, N=365) reported that they are familiar with gamification in teaching and learning, almost half of them (49.5%, N=308) have used gamification in their educational design, whereas more than half of them (52.1%, N=324) had not experienced gamified learning in the past, and most of them (73.3%, N=456) had not taken part in any gamified MOOC before. Most of the eLearning Professionals (72.6%, N=154) appear to be familiar with gamification in teaching and learning, more than half of them (62.7%, N=133) had experienced gamification in learning in the past, and almost half of them (48.1%, N=102) have used gamification in their educational design. However, similarly to School Teachers, eLearning Professionals also had not taken part in gamified MOOCs before (66.5%, N=141). On the other hand, only few of the Higher Education Students (39.7%, N=58) reported familiarity with gamification in teaching and learning, even fewer (30.1%, N=44) had experienced gamification in learning in the past, and the majority of those students had not used gamification in their educational design (78.1%, N=114) and had not enrolled in gamified MOOC (85.6%, N=125).

School Teachers are overall favorable towards gamification (M=4.25, SD=0.892), with 72.0% (N=448) rating the respective statement as True or Very True, and similarly, eLearning Professionals are also in favor of it (M=4.21, SD=0.892), with 72.2% (N=153, Missing Values=10) agreeing on the truth of the respective statement, while Higher Education Students are less favorable (M=3.72, SD=0.944), with 52.1% (N=76, Missing Values=8) finding the statement True or Very True. The difference in the attitude towards gamification are considered statistically significant (F(2,935)=19.772, p=.000) (**Appendix B.2**).

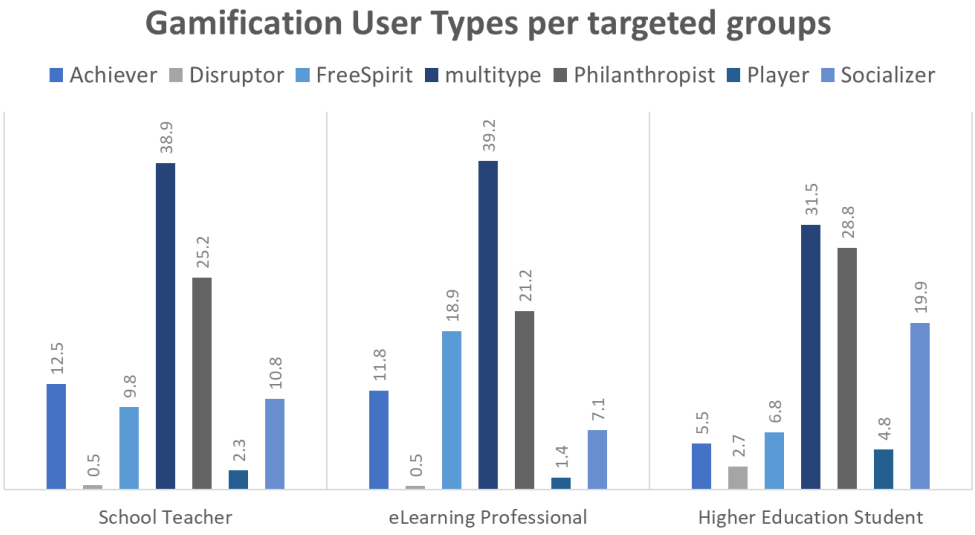

Figure 13: Gamification User Types per targeted group

Furthermore, regarding the Gamification User Types, most School Teachers (38.9%, N=242), as well as eLearning Professionals (39.2%, N=83), and Higher Education Students (31.5%, N=46) were

identified as Multitype, followed by Philanthropists (25.2%, N=157) and Achievers (12.5%, N=78) for School Teachers, by Philanthropists (21.2%, N=45) and Free Spirits (18.9%, N=40) for eLearning professionals, and by Philanthropists (28.8%, N=42) and Socializers (19.9%, N=29) for Higher Education Students respectively. Figure 13 displays these results. The complete results can be found in **Appendix B.2**.

6.1.2. Participants' Profiles as per post-course completion

Phase B of L2A MOOC was open until 06/06/2021. From the 1249 participants who enrolled and started the main corpus of the course, i.e., Modules 2 – 8, after answering the pre-course survey, 280 passed the assessment for certificate level A and 137 passed the assessment for certificate level B. Overall, 287 participants passed at least one of the assessments and answered the post-course survey to receive their certificates. From the 287 responses, 1 duplicate was removed. The unique responses were 286, which correspond to the number of participants who completed the MOOC. We consider that a participant has completed the course when s/he has received the certificate of achievement (i.e., succeeded at least one final assessment and submitted both pre- and post-course surveys).

Completion Rate = 22.90%

Completion Rate of Phase A: 20.45%

In total, there was an **increase** both in terms of registrations (2971 in Phase B compared to 1920 in Phase A), initiation of the L2A MOOC (1249 in Phase B compared to 1147 in Phase A), and certification and completion (286 in Phase B compared to 235 in Phase A).

To match the participants' answers in pre- and post-course surveys, participants were prompted to produce and provide an, easy to remember and difficult to decode, Unique ID Code. However, there was high mismatch in the mapping between the codes generated in the pre- and post- course surveys (28.67%, N=82), thus, we further proceeded to mapping the participants via their emails.

Next we will describe the profile of participants that completed the course, calculate the completion rate for the different targeted groups of participants, and examine how these profiles are related to course completion, learning experience (after the interventions), and EDL competence advancement.

6.1.2.1. Generic profiles of participants who completed the course and per targeted group

For profiling the participants who completed the course and examining the effects of the interventions applied during Phase B on the learning outcomes, including the successful course completion and the advancement in EDL competence level of the participants, we followed a protocol similar to profiling the enrolled participants, consisting of three categories of characteristics: a) generic demographic elements: age, gender, and country of residence; b) background knowledge: educational qualifications and experience with MOOCs, English, and technology; and c) professional experience. We also extracted and determined the respective profiles of the targeted groups identified in the previous analysis – i.e., the School Teachers, eLearning Professionals, and Higher Education Students – so that next, we can associate those profiles to the outcomes and the interventions applied, as well.

a) General

Table 7 and Figure 14 display the descriptive statistics and distribution of participants who completed the L2A MOOC Phase B, respectively. Their mean age was 40.99 years (SD=11.794), slightly lower than the mean age of participants who started the course (M=42.8, SD=10.64 – see section 6.1.1.1.), and statistically significantly lower than the mean age (M=43.37, SD=10.223) of participants who did not complete the course (t(1247)=3.316, p=0.001) (**Appendix B.3**). The mean age of participants in Phase A was 40.68 years (SD=10.51) and 37.78 years (SD=11.386) for those who enrolled and those who completed that phase, respectively, with this difference being statistically significant, as well.

Table 7: Descriptive statistics of age of participants' who complete the course

Statistics

age

N	Valid	286
	Missing	0
Mean		40.99
Median		43.00
Std. Deviation		11.794
Percentiles	25	31.75
	50	43.00
	75	50.00

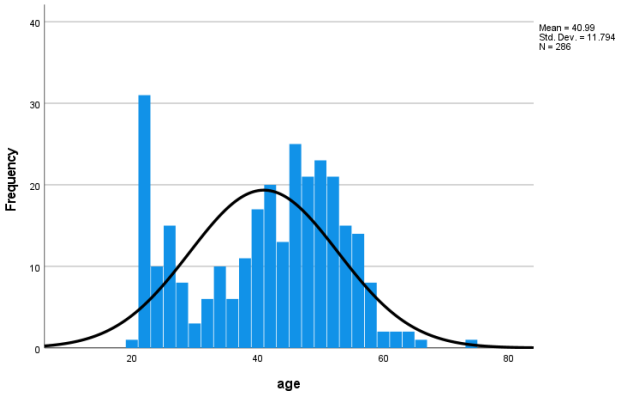

Figure 14: Distribution of participants who completed the course per age

The majority of participants who answered the post-course survey was females (68.2%, N=195), with a completion rate of 23.78% (i.e., 195 out of the 810 who answered the pre-course survey). The completion rate for males (21.95%) was statistically similar, with 90 (31.5%) males completing the course and receiving their certificate out of the 410 who initially started in the course (**Appendix B.3**).

The 286 participants who finished Phase B were distributed in 20 countries (**Appendix B.3**). Although most of the participants that completed the course were form Greece (185 participants – 64.7%) followed by Germany (67 participants – 23.4%), the participants from Germany had higher completion rate (40.85% compared to 24.67% completion rate of participants from Greece). Figure 15 shows the completion rates for the 5 most reported countries of residence in the pre-course survey.

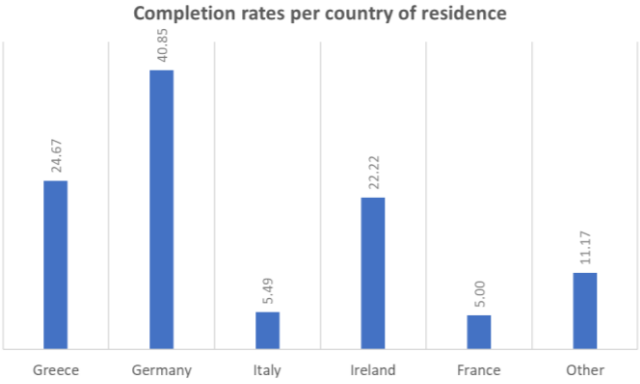

Figure 15: Completion rate per country of residence

b) Background knowledge

According to the reported highest level of education, more than half of participants who completed the course holds a Master's Degree (52.4%, N=150), followed by participants who hold a High School Diploma (17.8%, N=51), and participants who have a Bachelor's Degree (15.7%, N=45). Less are the participants who hold a Doctoral Degree (9.1%, N=26). With respect to the completion rates, participants who hold a High School Diploma had the highest rate (54.25%), followed by participants with a Master's Degree (21.28%), and participants with a Bachelor's Degree (19.23%) (**Appendix B.3**).

Participants who completed the L2A MOOC Phase B also report a moderate previous experience with MOOCs, with a mean enrolment in 3.21 (SD=3.974) MOOCs and a mean completion of 2.90 (SD=3.866). It is interesting that 93.2% of participants who reported that they enrolled in 2-4 MOOCs, had also reported that they completed them, and similarly, 83.3% of those who enrolled in 5-10 MOOCs, also reported that they had completed them. For the complete statistics, see **Appendix B.3**.

Furthermore, 70.6% (N=202) of the participants reported high (N=104) or very high (N=98) level of proficiency in English (M=4.00., SD=0.889), and the reported comfort with technology was even higher, with 78% (N=224) participants claiming high (N=129) or very high (N=95) comfort (M=4.08, SD=0.800) respectively.

c) Professional experience

With respect to the job sector, 51.7% (N=148) of the participants who answered both the pre- and post- course surveys work in K-12 Education, and 22.0% (N=63) work in University. Overall, 76.2% (N=218) of the participants who completed the course work in Formal Education sector, with only 5.9% (N=17) working in Industry/Business, 7.7% (N=22) being Self/Not-employed, and 10.1% (N=29) working somewhere else. The completion rate for participants who work in Formal Education was 25.8%, and the completion rate for participants from Industry/Business was 12.06% (**Appendix B.3**).

In addition, in the previous section (6.1.1.1.), participants were classified into three major professional roles (i.e., targeted groups), namely School Teachers, eLearning Professionals, and Higher Education Students. The specific profiles of the targeted groups will be further described in the next sub-section. Figure 16 shows the distribution of participants who completed the course per targeted group.

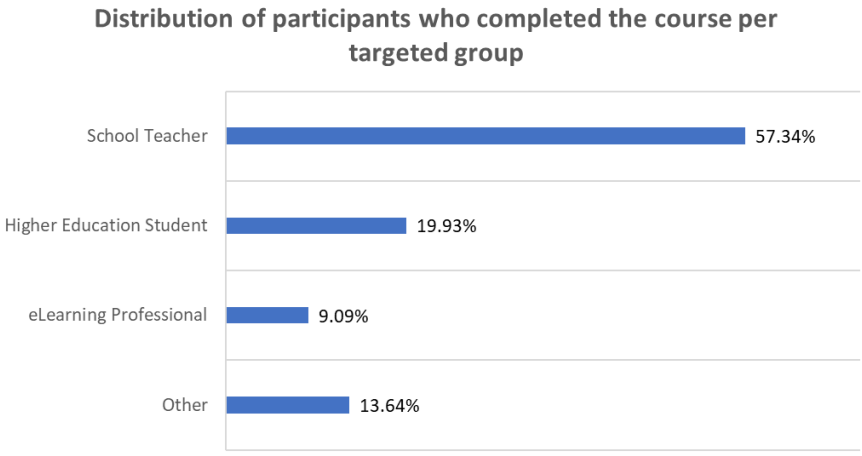

Figure 16: Participants who completed the course per targeted group

The participants who completed Phase B of the L2A MOOC reported a mean of 12.08 years (SD=8.466) in the professional roles, and a mean of 6.55 years (SD=5.829) of experience in digital teaching and learning (**Appendix B.3**).

d) Per targeted group

To gain a better understanding of the participants who completed the L2A MOOC Phase B, we explored also the generic profiles per targeted group. In particular, the School Teachers had a mean age of 45.99 years (SD=7.478), 70.7% (N=116) of them were females, 95.1% (N=156) were coming from Greece (followed by 1.8%, N=3 from Croatia), and they reported a mean of 17.10 years (SD=6.956) of experience in their professional role and a mean of 7.63 years (SD=6.584) of experience in digital teaching and learning. Furthermore, the eLearning Professionals had a mean age of 43.73 years (SD=12.151), and half of them (50.0%, N=13) were females. Half of the eLearning Professionals were either from Greece (26.9%, N=7) or Germany (26.7%, N=7), and the rest were distributed in 8 other countries (15.4%, N=4 from Italy). This targeted group reported a mean of 7.33 years (SD=6.766) of professional experience in their role and a mean of 7.52 years (SD=6.709) of experience in digital teaching and learning. Finally, the Higher Education Students had a mean age of 24.16 years (SD=4.836), were mostly females (73.7%, N=42), and were originating either from Germany (87.7%, N=50) or from Greece (26.3%, N=7). Those students reported a mean of 3.31 years (SD=1.772) of experience in their professional role and a mean of 3.18 years (SD=0.928) of experience in digital teaching and learning.

In terms of completion rates per targeted group, the Higher Education Students was the most committed group (39.04%, N=57), followed by School Teachers (26.37%, N=164), and by eLearning Professionals (12.24%, N=26). Figure 17 displays the comparison between participants who started the course and participants who completed the course per targeted group. The statistical difference between "*completers*" and "*droppers*" is significant in all targeted groups (F(3,1245)=16.88, p=0.000).

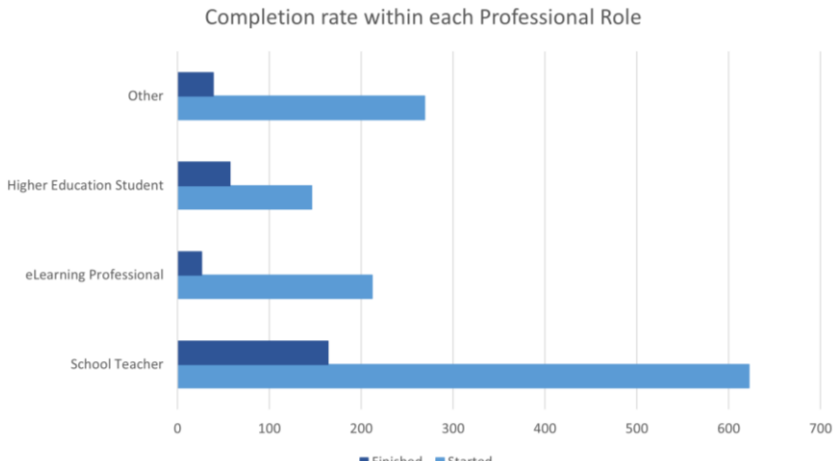

Figure 17: Completion within each targeted group

The complete descriptive statistics about the demographic elements of the targeted groups, along with the statistical tests (i.e., ANOVA and t-tests) can be found in **Appendix B.3**.

6.1.2.2. Motivational profiles of participants who completed the course and per targeted group

In line with the protocol for extracting the motivational profiles of participants who enrolled in L2A

MOOC Phase B, four motivational aspects were examined as dimensions of the profiles of participants who completed the course: a) their goals in taking the course; b) the reasons for enrolment; c) their GRIT score (i.e., passion and perseverance for long-term and meaningful goals); and d) self-confidence. Using the same protocol, we describe the respective motivational profiles per targeted groups, as well.

In section 6.1.3, we explore the relationships between the identified motivational profiles and course completion, whereas in section 6.1.4, we explore the relationships between those profiles and EDL Competence advancement (as a learning outcome).

a) Goals

Most participants who completed the course (76.9%, N=220) answered that they were "*Planning to follow the course schedule and complete all activities to earn a certificate of completion*". The second most popular goal set by participants who answered the post-course survey was "*General curiosity*" (5.9%, N=17), and other common goals was "*Auditing, but intend to follow the course schedule*" (4.2%, N=12) (**Appendix B.3**).

b) Reasons for enrolment

The most popular reason for enrolment for participants who received their certificates was "*[M2] to extend my current knowledge of the topic*" with a mean of 4.37 (SD=1.192), rated by 84.6% (N=242) of them as True or Very true. The second most popular reason was "*[M1] for personal development*", with a mean of 4.26 (SD=1.113) and with 78.0% (N=223) of participants agreeing that this statement is True or Very true. Descriptive statistics on the mean ratings of reasons for enrolment are available in **Appendix B.3**. Figure 18 shows the mean rating per reason for enrolment both for participants who completed the course (i.e., "*completers*") and for those who dropped-out (i.e., "*droppers*"). It can be seen that completers have rated higher reasons M3, M4, M5, M6, and M7, and lower reason M8.

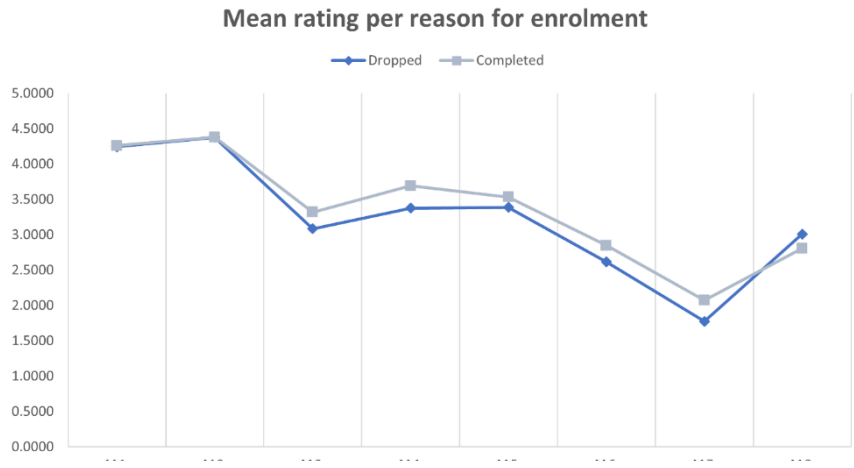

Figure 18: Mean rating per reason for enrolment for "*completers*" and "*droppers*"

The Independent samples t-test showed that statistically significant is the difference for "*[M4] …beneficial for my CV and future job applications*" (t(1247)=3.145, p=0.002), and for "*[M7] I was advised or ordered to take part in this course*" (t(1247)=3.099, p=0.002) (**Appendix B.3**).

c) GRIT Score

The GRIT score of the participants who answered the post-course survey in Phase B was moderate with a mean value of 3.20 (SD=0.414). The Independent samples t-test showed that there was no statistically significant difference in the GRIT Score between "*completers*" and "*droppers*". Descriptive statistics per GRIT statement, and the overall GRIT distribution graph can be found in **Appendix B.3**.

d) Self-confidence

Regarding the participants' self-confidence to learn course material, as well as the anticipated time-commitment on the course on a weekly basis, the respective means for the course completers were moderate (M=3.425, and M=3.93 respectively). In the question "*How confident are you in your ability to learn the material in this course?*", 51.0% (N=146) answered "*Very confident*" and "*Extremely confident*", while in the question "*How would you rate your possibility of finishing this course according to the anticipated time commitment as defined in the syllabus?*", 70.3% (N=201) answered "*Very confident*" and "*Extremely confident*". Participants reported that they were planning to allocate 4.9 hours on the course per week on average. Specifically, most of the participants reported a time-allocation of either 3-4 hours (37.1%, N=106) or 5-6 hours (28.7%, N=82) on the course on a weekly basis. The comparison of the means of the self-confidence factors for "*completers"* and "*droppers"* is summarized in Figure 19. The Independent samples t-test showed that, in terms of self-confidence, there were statistically significant differences in all corresponding factors between "*completers*" and "*droppers*" (**Appendix B.3**).

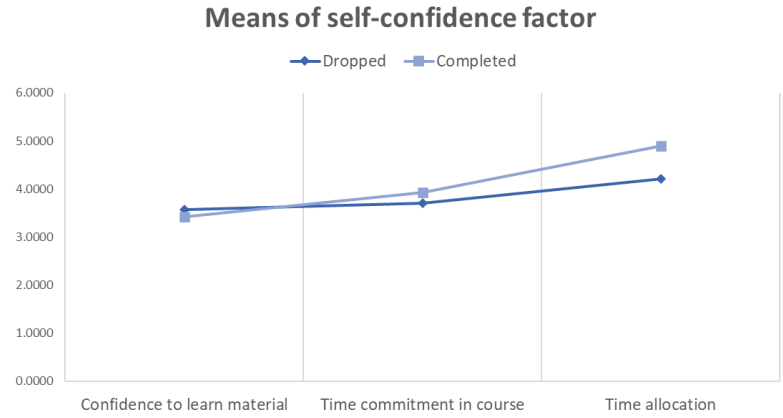

Figure 19: Means for self-confidence factors for "*completers*" and "*droppers*"

e) Per targeted group

Figure 20 illustrates the means of reasons for enrolment per targeted group of participants who completed Phase B of the MOOC. From the figure it can be seen that School Teachers and eLearning Professionals are mostly enrolled "*[M2] to extend current knowledge of the topic*", and in general they follow a similar pattern on reasoning their participation, whilst Higher Education Students are enrolled mostly because "*[M5] it is relevant to my academic field of study*". We further explored the statistical difference in the means of reasons for enrolment between the targeted groups, and the one-way ANOVA revealed that the differences are significant for M1 ($F(3, 282)=13.586$, $p=0.000$), M2 ($F(3,282)=8.042$, $p=0.000$), and M7 ($F(3,282)=14.359$, $p=0.000$) (**Appendix B.3**).

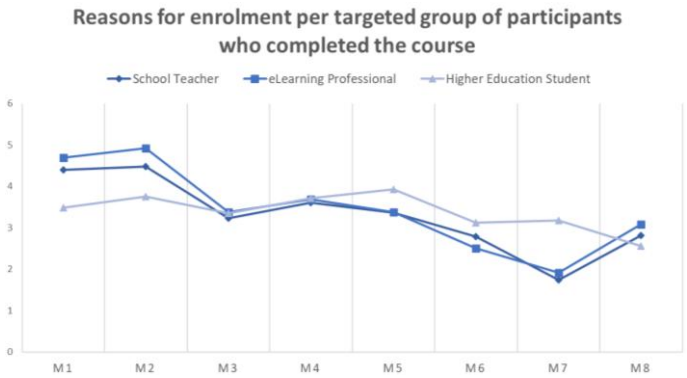

Figure 20: Reason for enrolment per targeted groups of participants who completed the course

In addition, the GRIT Score of participants who completed the course per targeted group was moderate for all groups, varying from 3.18 for School Teachers to 3.20 for Higher Education Students to 3.30 for eLearning Professionals. The differences in the means were not found statistically significant, but there are some differences in the individual GRIT statements (i.e., GRIT1, GRIT4, GRIT5, GRIT6, and GRIT8). The total ANOVA results are available in **Appendix B.3**.

6.1.2.3. EDL competences advancement of participants who completed the course and per targeted group

In the pre-course survey, participants self-evaluated their perceived initial EDL competence level, from Novice (1) to Expert (5), and the initial EDL competence level for all dimensions was approximately 2=*Advanced beginner*.

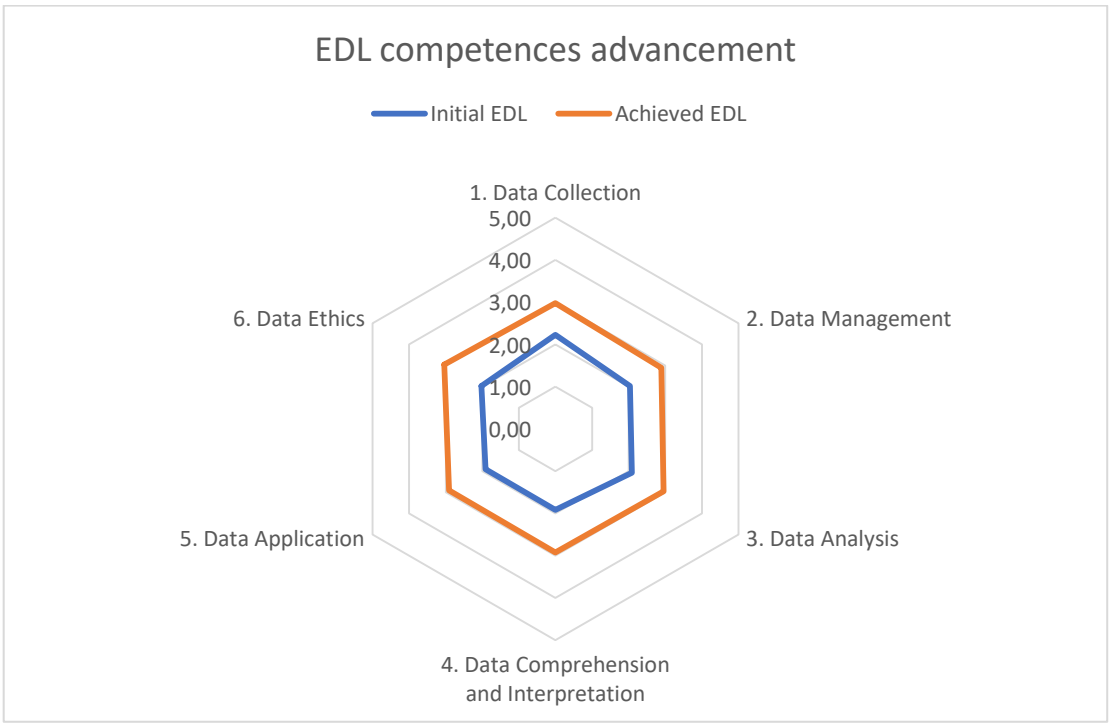

Figure 21: Initial and concluding EDL Competences Profile for participants who completed the course

After the completion of the course, participants were requested to provide again their perceived current EDL competence level for each EDL statement and each EDL dimension described in

Appendix A. The concluding EDL competence level for all dimensions was approximately 3=*Competent*, thus, completing the course resulted to one-level advancement of competences for each EDL dimension. The advancement in EDL competence level is shown in Figure 21, where both the initial and concluding levels are represented. The complete statistics (mean, standard deviation) for all dimensions of participants' concluding EDL competence level can be found in **Appendix B.3**.

We also explored the change in EDL competence per targeted group of participants who completed the course. As already explained in section 6.1.1.5.c, eLearning Professionals have reported slightly higher initial competence in [D3] Data Analysis, [D4] Data Comprehension and Interpretation, [D5] Data Application, and [D6] Data Ethics; School Teachers appear to have higher initial competence in [D1] Data Collection and [D2] Data Management; Higher Education Students reported the lowest initial competence level in all EDL dimensions. The statistical analyses (ANOVA and Independent samples t-tests) shown not statistically significant difference between those groups, and between the couples of targeted groups (i.e., School Teachers - eLearning Professionals, Higher Education Students - eLearning Professionals, and Higher Education Students - School Teachers) respectively.

The achieved competence level per targeted group for all EDL dimension is illustrated in Figure 22. As seen in this figure, eLearning professionals and School Teachers have achieved similar level of EDL competence in all dimensions, while the respective concluding competences for Higher Education Students appear to be lower. This finding resulted in further exploration of the statistical significance of the differences in the mean EDL competence levels between the targeted groups.

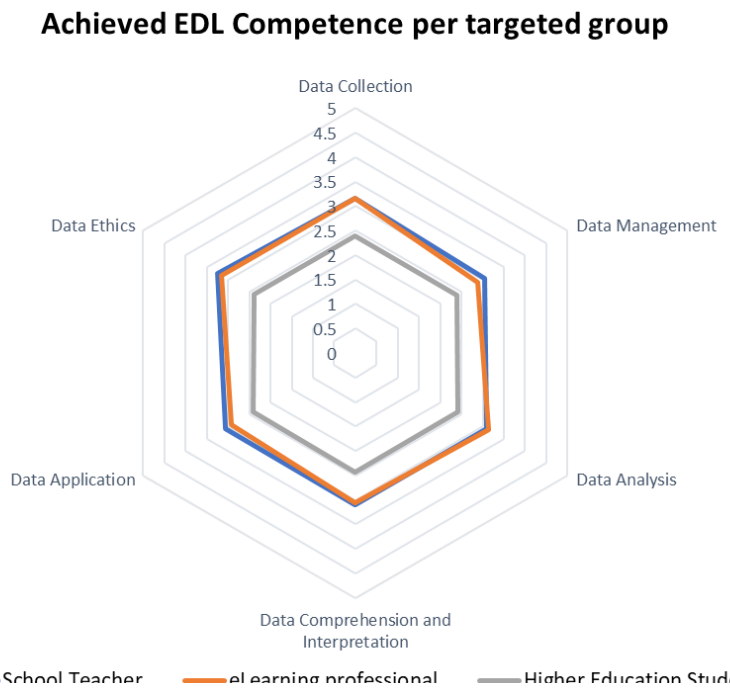

Figure 22: Achieved EDL Competences Profile per targeted groups for participants who completed the course

The one-way ANOVA showed that there are statistically significant differences between the groups in all dimensions, and the additional Independent samples t-test between the couples of the groups (i.e., School Teachers - eLearning Professionals, Higher Education Students - eLearning Professionals, and Higher Education Students - School Teachers) clarified that the statistical differences in the achieved EDL competences between School Teachers and eLearning Professionals are not significant, but the differences in the mean achieved EDL levels of those groups to the Higher Education Students were both found significant in all EDL dimensions (**Appendix B.3**).

However, those differences *per se* do not provide sufficient insight on the *advancement* of the EDL competences (i.e., the change from the initial EDL competence levels to the achieved EDL competence level) per targeted group. Thus, it is also important to investigate the significance of this advancement per group. The paired-samples t-test confirmed that all targeted groups achieved statistically significant advancement in all EDL dimensions, with the eLearning Professionals achieving the highest mean advancement in all dimensions except [D5] Data Application, in which the School Teachers had the highest advancement, while the Higher Education Students had the lowest mean advancement in their competences in all EDL dimensions (**Appendix B.3**). Figures 23, 24, and 25 illustrate the initial and achieved EDL competence (i.e., the advancement) for School Teachers, eLearning professionals, and Higher Education Students, respectively.

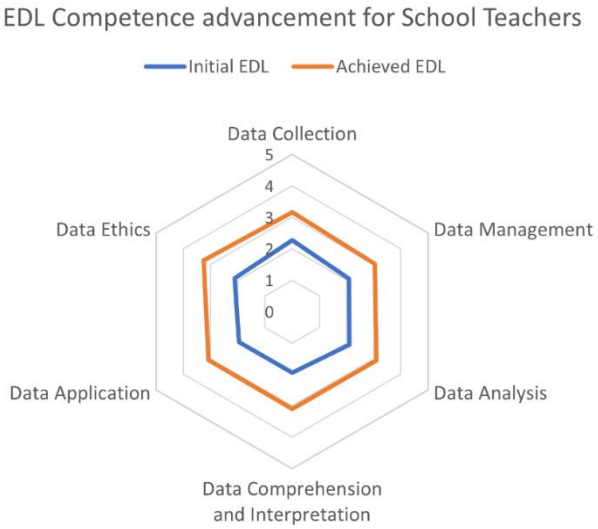

Figure 23: EDL Competences advancement for School Teachers

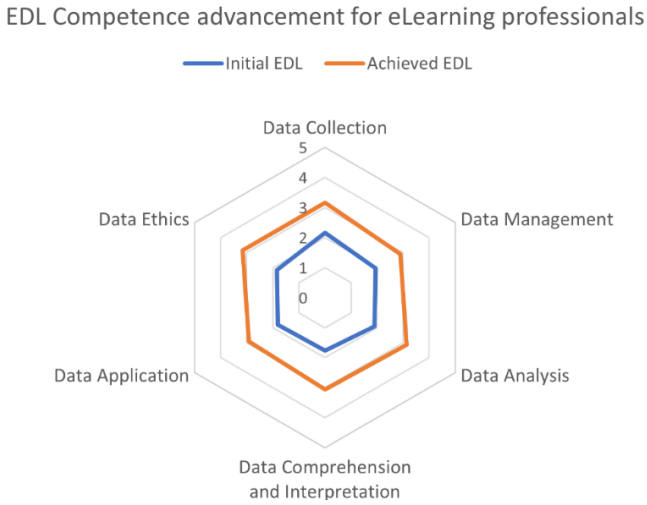

Figure 24: EDL Competences advancement for eLearning Professionals

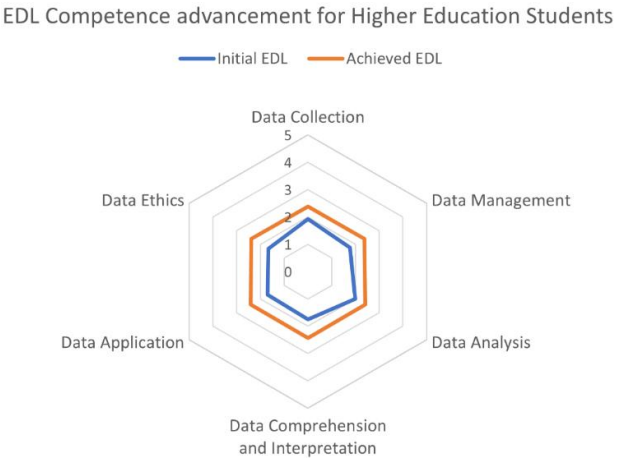

Figure 25: EDL Competences advancement for Higher Education Students

6.1.2.4. Gamification profiles of participants who completed the course and per targeted group

The gamification profiles of the participants who answered the post-course survey to receive their certification of completion, were also studied following the same protocol as for the participants who enrolled in the course, and three basic aspects were examined: a) previous experience with gamification; b) attitude towards gamification; and c) gamification user types. The gamification profiles were also explored for the targeted groups of participants who completed the course.

a) Previous experience with gamification

Most of the participants who completed Phase B of the course (59.8%, N=171) were familiar with gamification in teaching and learning so far, and more than half of the participants (52.1%, N=149) reported that they had experienced gamification in learning context before. However, more than half of the participants (53.8%, N=154) reported that they had not used gamification in their educational design, and most of the participants (72.0%, N=206) had never enrolled in a gamified MOOC in the past. Those responses are illustrated in Figure 26.

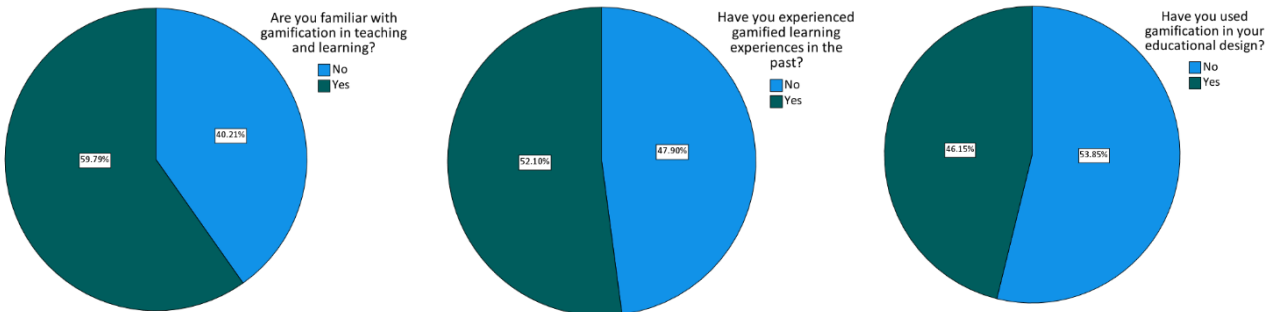

Figure 26: Previous experience with gamification

b) Attitude towards gamification

Similar to the participants who enrolled in the course, participants who completed it had a favorable attitude towards gamification, with a mean of 4.29, and most of them (67.8%, N=194) rated this statement either as True or Very true. Although there was an option "Not Applicable", only 8 participants selected it. Detailed statistics can be found in **Appendix B.3**.

c) Gamification User Types

Regarding the gamification user types, most of the participants who completed the course determined themselves as Multitype (34.27%, N=98), followed by Philanthropists (23.08%, N=66), and Socializers (14.0%, N=40). It is interesting to notice that, unlike the participants who enrolled in the course for which the third most popular category was the Free Spirits (12.9%, see section 6.1.1.4.c), the respective gamification user type is the fifth most common (10.5%, N=30) in the group of participants who completed the course. The Disruptors and Players are again the least common gamification types. Figure 27 summarizes those findings. Descriptive statistics per gamification user type can be found in **Appendix B.3**.

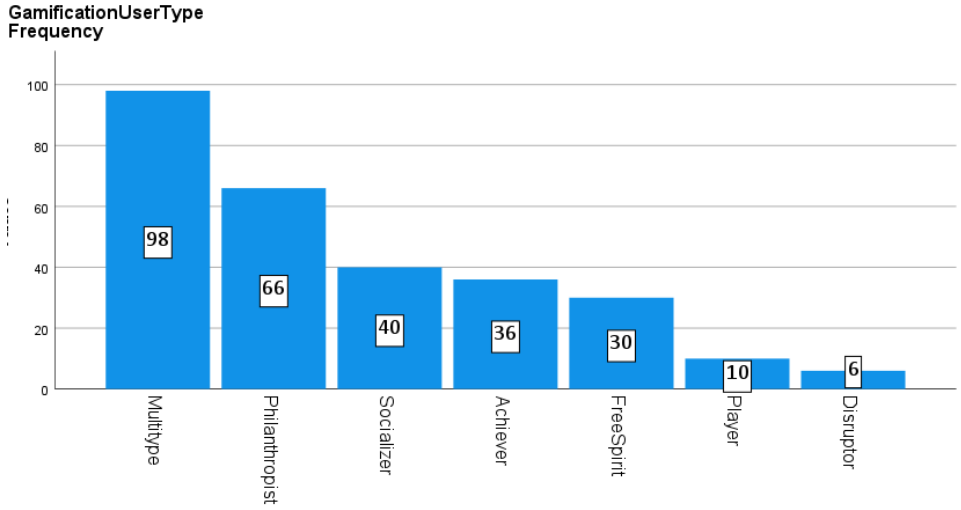

Figure 27: Distribution of gamification user types for participants who completed the course

d) Per targeted groups

The per targeted group exploration of gamification profiles revealed that most of School Teachers (65.2%, N=107) are familiar with gamification in teaching and learning. 57.3% (N=94) have experienced gamification in learning in the past and also have used gamification in their own educational design. Still, most of them (67.1%, N=110) had not taken part in gamified MOOCs before. The School Teachers are in general in favor of gamification (73.8%, N=121 rated this statement as True or Very True). The second biggest group of participants who completed the course (i.e., Higher Education Students) demonstrate a totally opposite profile compared to the School Teachers. In particular, most Higher Education Students (71.9%, N=41) reported that they were not familiar with gamification in teaching and learning, 78.9% (N=45) claimed that they had no previous experience of gamification in learning, 86% (N=49) had not used gamification in their educational design, and 94.7% (N=54) had not taken part in gamified MOOCs before. However, they appear to be in favor of gamification, since 45.6% (N=26) rated this statement as True or Very true. The profile of the eLearning Professionals has more similarities to the profile of the School Teachers. Specifically, most eLearning Professionals (84.6%, N=22) agreed that they were familiar with gamification in teaching and learning, 80.8% (N=21) said that they had experienced gamification in learning in the past, 57.7% (N=15) reported that they have used gamification in their educational design, and 84.6% (N=22) are in favor of gamification, although only 30.7% (N=8) had taken part in gamified MOOCs before.

Regarding the gamification user types, School Teachers and eLearning Professionals are mostly Multitype (38.4%, N=63 and 38.5%, N=10 respectively), yet Higher Education Students are mostly Socializers (29.8%, N=17). The second most common gamification type for School Teachers is

Philanthropist (24.4%, N=40), for eLearning Professionals it is either Achiever or Free Spirit (19.2%, N=5), and for Higher Education Students it is Philanthropist (22.8%, N=13). The gamification user types per targeted groups for participants who completed the MOOC are synopsized in Figure 28.

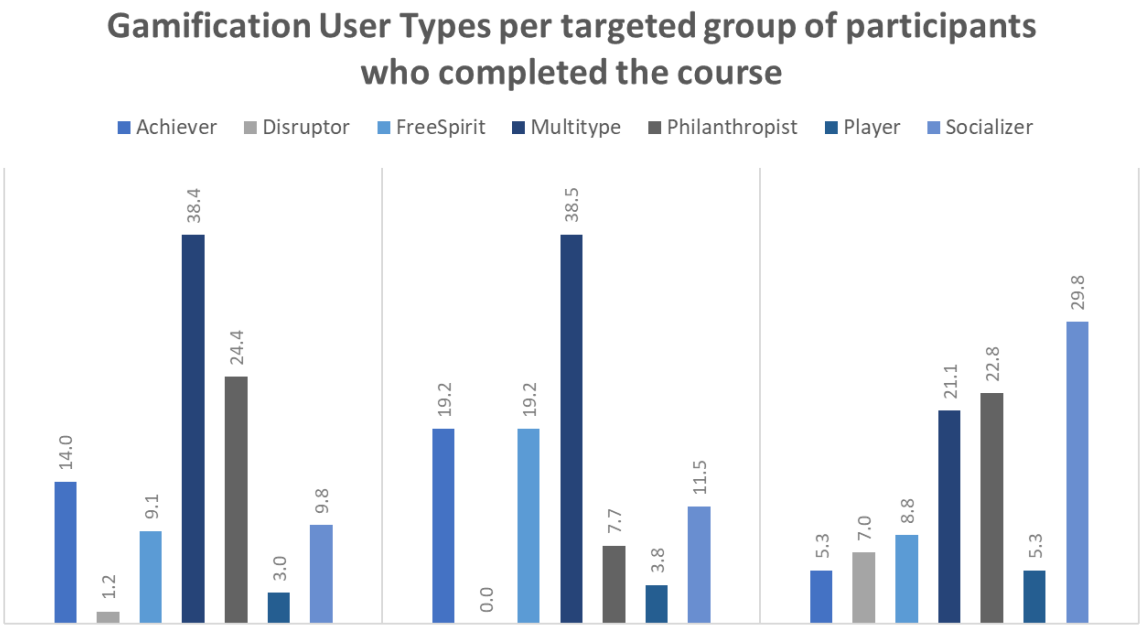

Figure 28: Gamification user types per targeted group for participants who completed the course

6.1.3. Relationship between participants' motives and course completion

As explained in section 6.1.2, the completion rate in L2A MOOC Phase B was 22.90%. After examining the profiles of the participants who enrolled in the course and of those who completed the course, the motivational factors that are associated to the completion rate were also explored, i.e., a) reasons for enrolment both independently and as internal/external motives; b) GRIT score; and c) self-confidence to learn material, time-commitment to the anticipated time to complete the course, and expected time allocation on the course.

a) Relations between reasons for enrolment, internal/external motives and course completion

The statistical analysis showed that significant correlations to course completion existed for reason "[M3] *obtain a job relevant qualification*", (r=0.066, p=0.020); "[M4] *beneficial for my CV and future job applications*" (r=0.089, p=0.002); and "[M7] *advised or ordered to take part in the course*" were significantly correlated to course completion (r=0.087, p=0.002). It's worth mentioning that, in all these three reasons, completers had given a higher rate, and in addition, there was statistically significant difference between completers and droppers for reasons M4 and M7 (see section 6.1.2.2.b). Pearson's correlations can be found in **Appendix B.4**. Furthermore, as already explained in section 6.1.1.5.b, the motives were further grouped in internal and external, with internal motives including statements M1, M2, M5, M6, and M8, while external motives including statements M3, M4, and M7. In sense, external motives were statistically significantly correlated with course completion, as opposed to internal motives that do not appear to be related. Figure 29 illustrates the relationships between internal and external motives to completion rate.

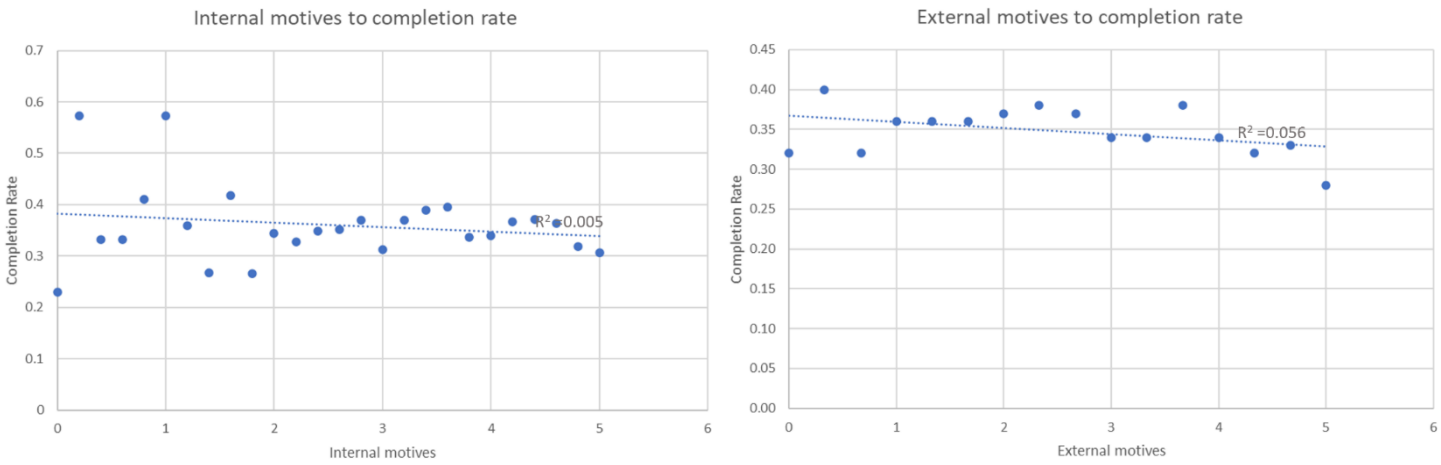

Figure 29: Relation of internal and external motives to completion rate

b) Relations between GRIT Score and course completion

The Independent samples t-test showed that there was no statistically significant difference in the GRIT Score between "*completers*" and "*droppers*" (see section 6.1.2.2.c). The additional correlation analysis showed that GRIT score is not associated with completion rate – although some of the GRIT dimensions have either strong positive (i.e., GRIT7 and GRIT8) or strong negative (i.e., GRIT1, GRIT5, GRIT6) relation to course completion – Pearson's correlations are available in **Appendix B.4**.

c) Relations between self-confidence to learn material, time commitment, time allocation and course completion

Confidence in learning the material had strong negative correlation to course completion (r=-0.068, p=0.016), while confidence in completing the course on time and expected time allocation on the course (i.e., hours per week the participant was planning to spend in the course) seem to have strong positive correlation (r=0.105, p=0.000; r=0.131, p=0.000) to course completion (**Appendix B.4**). This result extends the previous finding that there were statistically significant differences between "*completers"* and "*droppers"* with respect to the self-confidence factors (see section 6.1.2.2.d). Figures 30 and 31 show the relationship between the two types of self-confident variables and course completion, and the between time allocation and course completion.

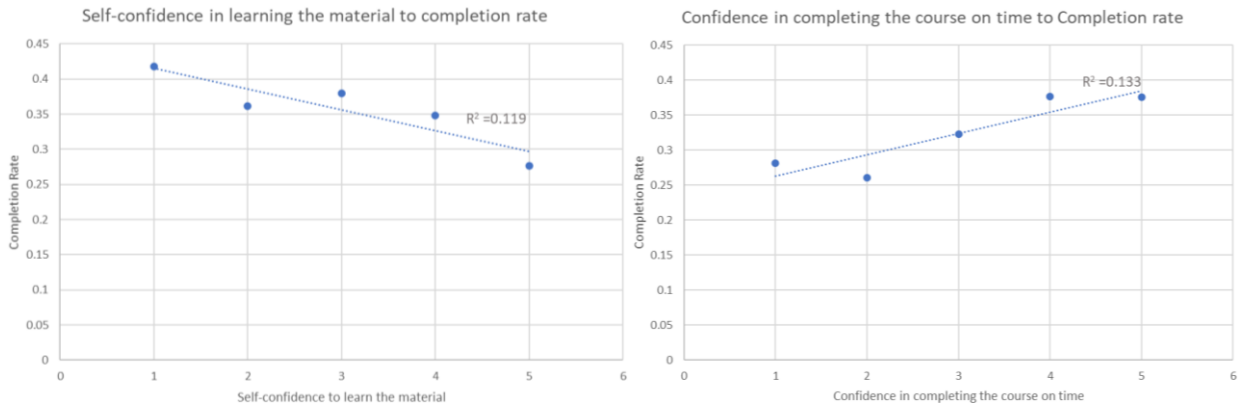

Figure 30: Relation of self-confidence factors to completion rate

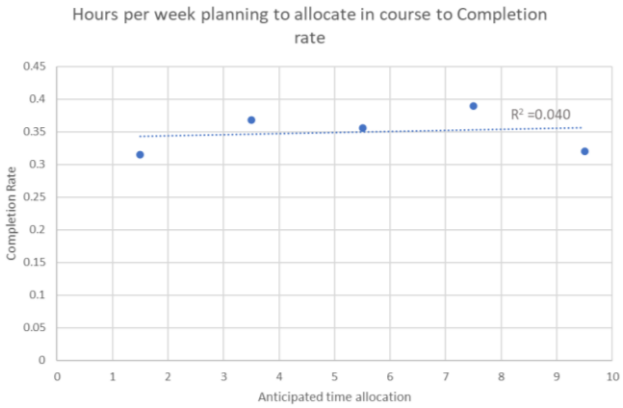

Figure 31: Relation of hours planning to allocate in course to completion rate

6.1.4. Relationship between participants' motives and EDL competences advancement

After examining the relationships between motives and course completion, the motivational factors that are associated to EDL competence advancement were also explored, i.e., a) reasons for enrolment both independently and as internal/external motives; b) GRIT score; and c) self-confidence to learn material, time-commitment to the anticipated time to complete the course, and expected time allocation on the course.

a) Relations between reasons for enrolment, internal/external motives and EDL competence advancement

In previous section, we found that Internal Motives had no effect on course completion, while External Motives are strongly positively related to course completion. The correlation analysis did not show any statistically significant relationship between the reasons for enrolment and EDL competence advancement (see Appendix B.4.). In Figure 32 we can see there is no relation between internal motives and EDL competence advancement, as well, whereas, although we found that External Motives have strong positive relation to course completion, we cannot conclude the same for their relation to EDL competence advancement, and there is no relationship between external motives and EDL competence advancement.

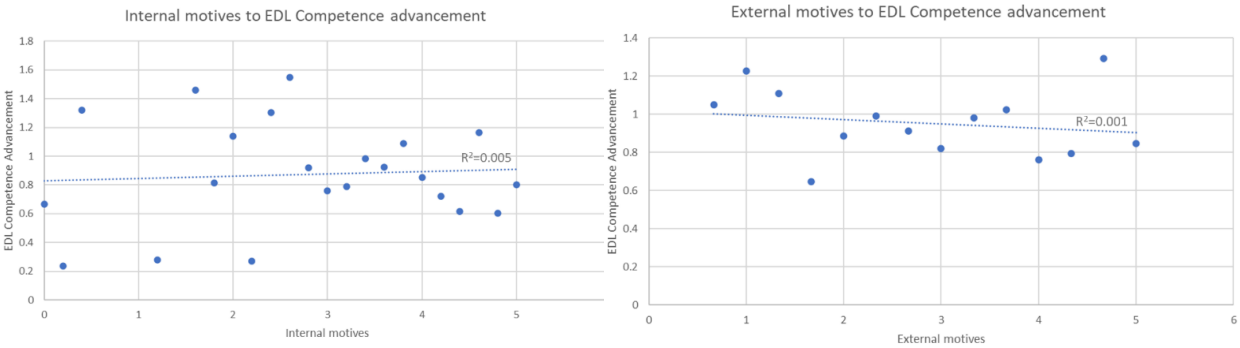

Figure 32: Relation of internal and external motives to EDL competence advancement

b) Relations between GRIT Score and EDL competence advancement

No statistically significant relation was found between the GRIT scores and EDL competence advancement for the participants who completed Phase B (a weak positive relation was detected only for GRIT8). The complete Pearson's correlations can be found in **Appendix B.4.**

c) Relations between self-confidence to learn material, time commitment, time allocation and EDL competence advancement

Examining the relation between the self-confidence factors (i.e., confidence to learn material and time-commitment to complete the course in the anticipated time) and EDL competence advancement, it was found that there is statistically strong negative relationship between self-confidence and EDL competence advancement, but no statistical relationships between time-commitment and progress in EDL competences (Figure 33) as well as between hours planning to allocate in course and EDL advancement (Figure 34).

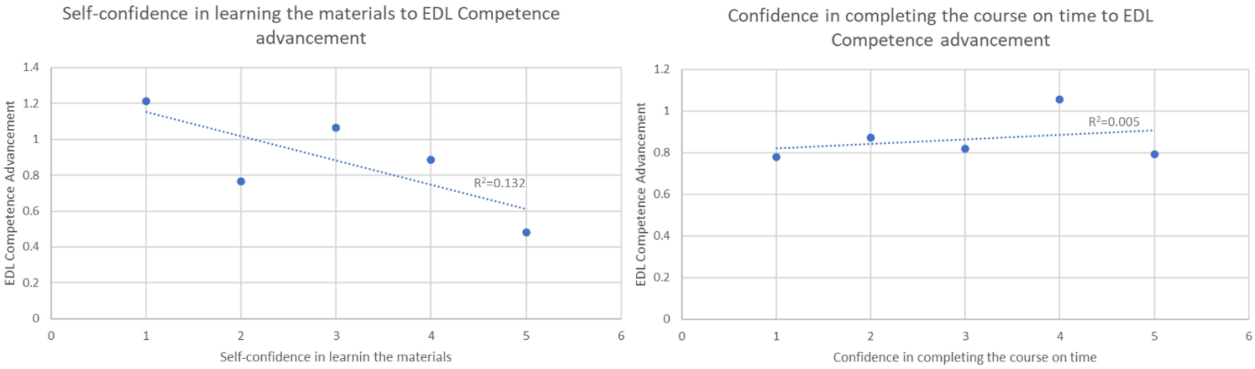

Figure 33: Relation of self-confidence factors to EDL competence advancement

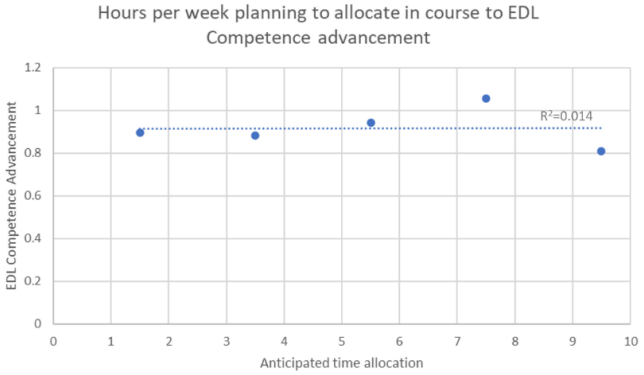

Figure 34: Relation of hours planning to allocate in course to EDL competence advancement

6.1.5. Relationship between participants' Gamification Experience and EDL Competence Advancement

The calculation of correlation showed a low positive one between overall gamification experience and *achieved* EDL competence level (r=0.278). There was not a statistically significant correlation with EDL competence level *advancement*, possibly due to the fact intial EDL level was almost unrelated with overall gamification experience. Analyzing further the correlation with each item of overall gamifiction experience, there was found a worth mentioned low, but still stronger than the overall, relationship with the sense of competence that gamification gave to participants (r=0.380), leading to the conclusion that the gamification elements being directly connected with EDL competences helped participants in a way to self-assess their level (**Appendix C2.2**). Figure 35 shows the relationship between the two corralated variables.

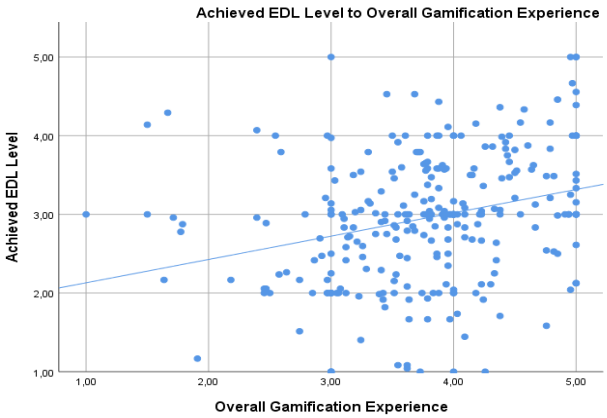

Figure 35: Scatter plot of achieved EDL level to overall gamification experience

Achieved EDL Level seemed to have a low, but still worth mentioned, positive relationship with learning experience and platform ease of use. It is interesting that EDL competence level advancement did not present a significant relationship with learning experience, neither platform ease of use nor overall gamification experience.

6.2 Evaluation of Experience

6.2.1 Learning Experience

For evaluating participants' experience in the course three-dimensions were identified: a) evaluation of the learning experience (per module and overall), b) evaluation of gamification (per module and overall), and c) actual engagement with the platform (from the analytics collected via the platform).

6.2.1.1 Learning Experience Per Module

In the post-course survey, participants were asked to rate their agreement to 11 statements (on a Likert-like scale from 1 to 5) concerning their learning experience in each module of the course. The statements covered participants' perceptions about the modules' clarity of learning objectives, comprehensibility of content, relevance of educational materials, up-to-date content, appropriateness of the instructional videos, quality of graphics, variety of content types, plurality of further readings, variety of learning activities, quality of micro-quizzes, and relevance of assessment to the learning objectives of the course (**Appendix A.2**). The rating per module varies from 3.5 to 4.4 on average (3=Neither agree nor disagree, 4= Agree, 5=Strongly agree), and descriptive statistics about the rating per module can be found in **Appendix C.1**. The mean ratings on each criterion per module are illustrated in Figure 36.

It becomes apparent from Figure 36 that participants who completed Phase B rated relatively high (score>4) their agreement to statements about the instructional design of the course (learning objectives clearly stated, variety of content types, relevance of the assessments with the LOs), the content (relevant educational materials, current up-to-date information, graphics), as well as the comprehensibility of content, appropriateness of the instructional videos, and the micro-quizzes in all modules, and marginally (score<4 and score>3.8) their agreement to appropriateness of further readings and learning activities in all modules[4]

[4] The categorization of scores was in line with the protocol defined in Phase A, so that comparisons could be made.

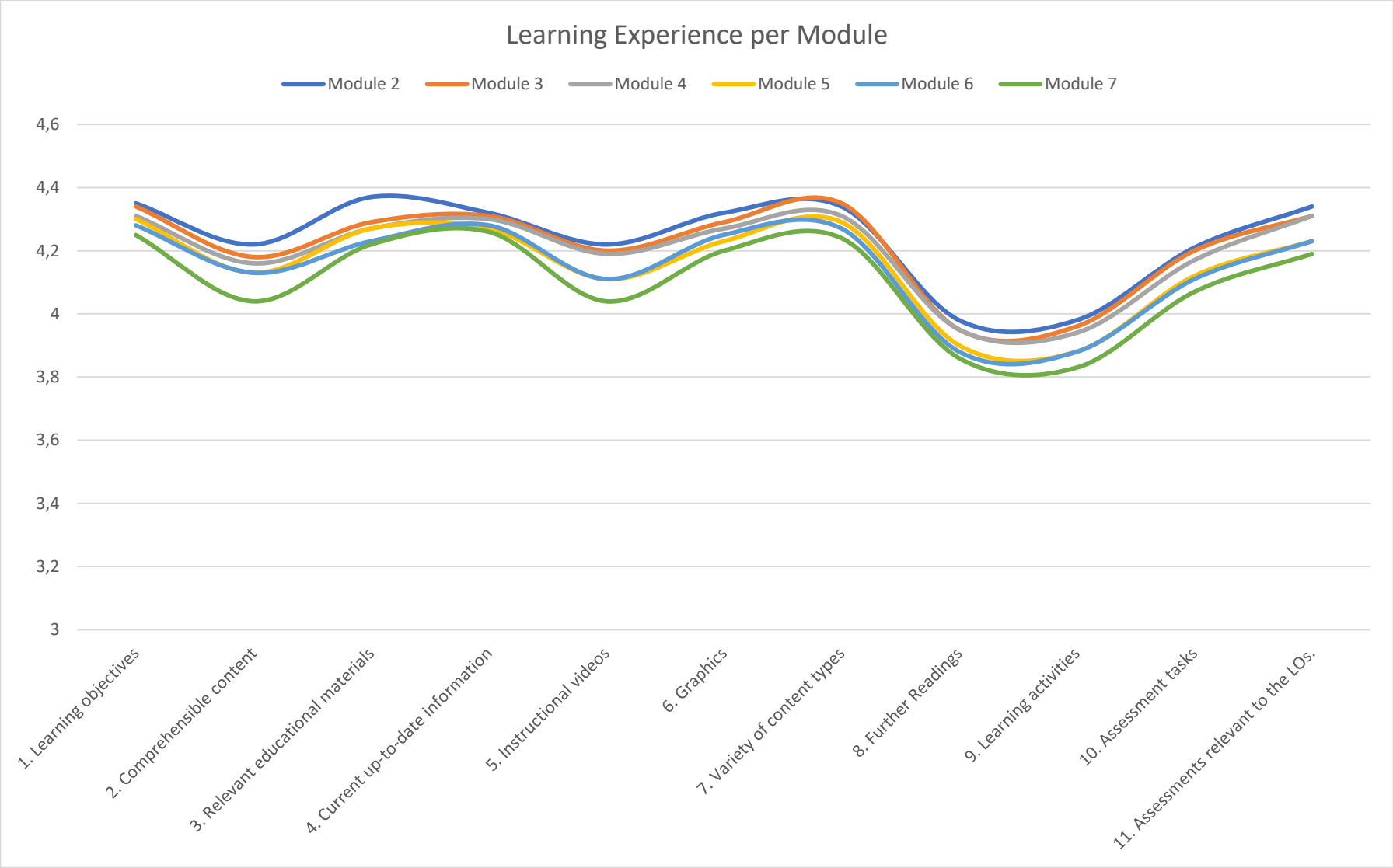

Figure 36: Learning experience per module

In addition, in the same section of the post-course survey, participants were asked to report the hours per week they spent on each module, as well as the posts they contributed to the discussion forums per module. Figures 37 and 38 synopsize the respective distributions. It can be seen in Figure 37 that most participants allocated either 3-4 hours or more than 8 hours per module.

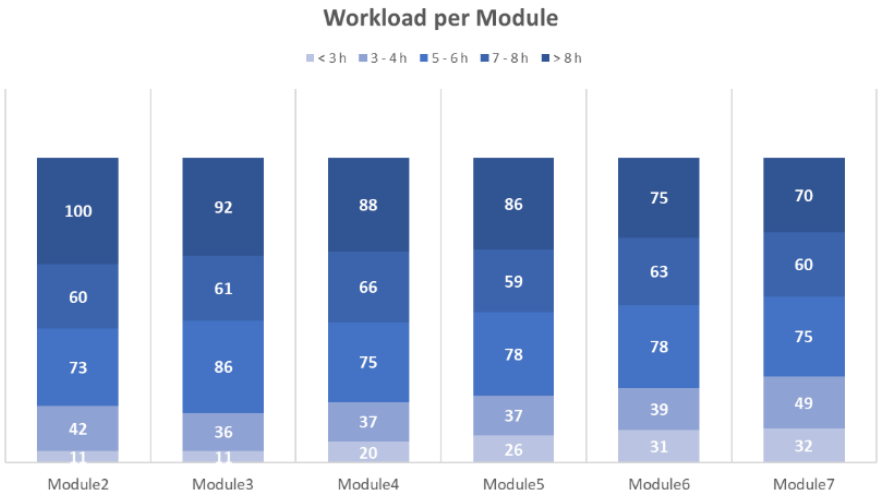

Figure 37: Distribution of the reported workload per Module

Forums in Modules 2 and 3 seem to be more active than in Modules 4-7. Overall, we can notice that over 50% of participants that completed the L2A MOOC Phase B and answered the post-course survey had contributed to forum discussions.

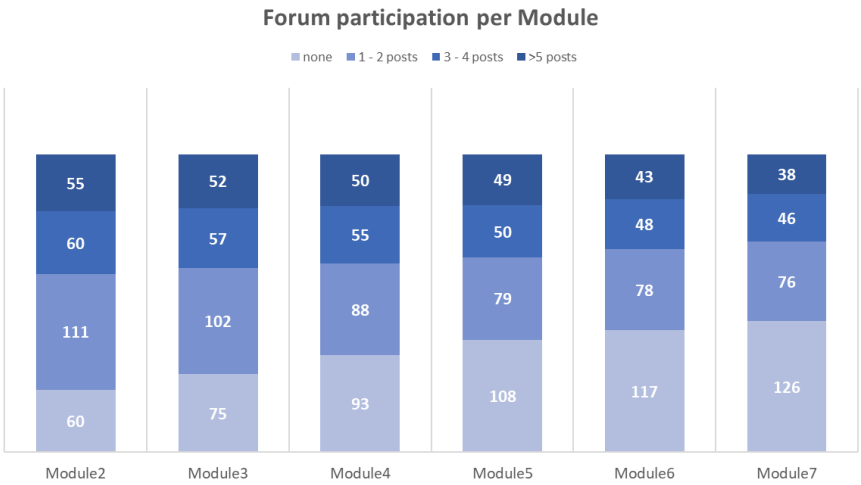

Figure 38: Reported forum participation per Module

6.2.1.2 Overall Learning Experience

Participants in the post-course survey were asked to rate 18 statements from "*Strongly disagree*" to "*Strongly Agree*", concerning the perceived overall Learning Experience. The statements covered topics related to five generic dimensions: a) Learning experience (LX: Statements 5-11), b) Platform ease of use (PEoU: Statements 1-4, 12), c) Confirmation of expectations (CONF: Statements 13, 15), d) Satisfaction (SAT: Statements 14, 16), and e) Continuance intention (INT: Statements 17, 18).

Figure 39 presents the percentages of "*Agree"* and "*Strongly Agree*" to the 18 statements of the overall learning experience evaluation.

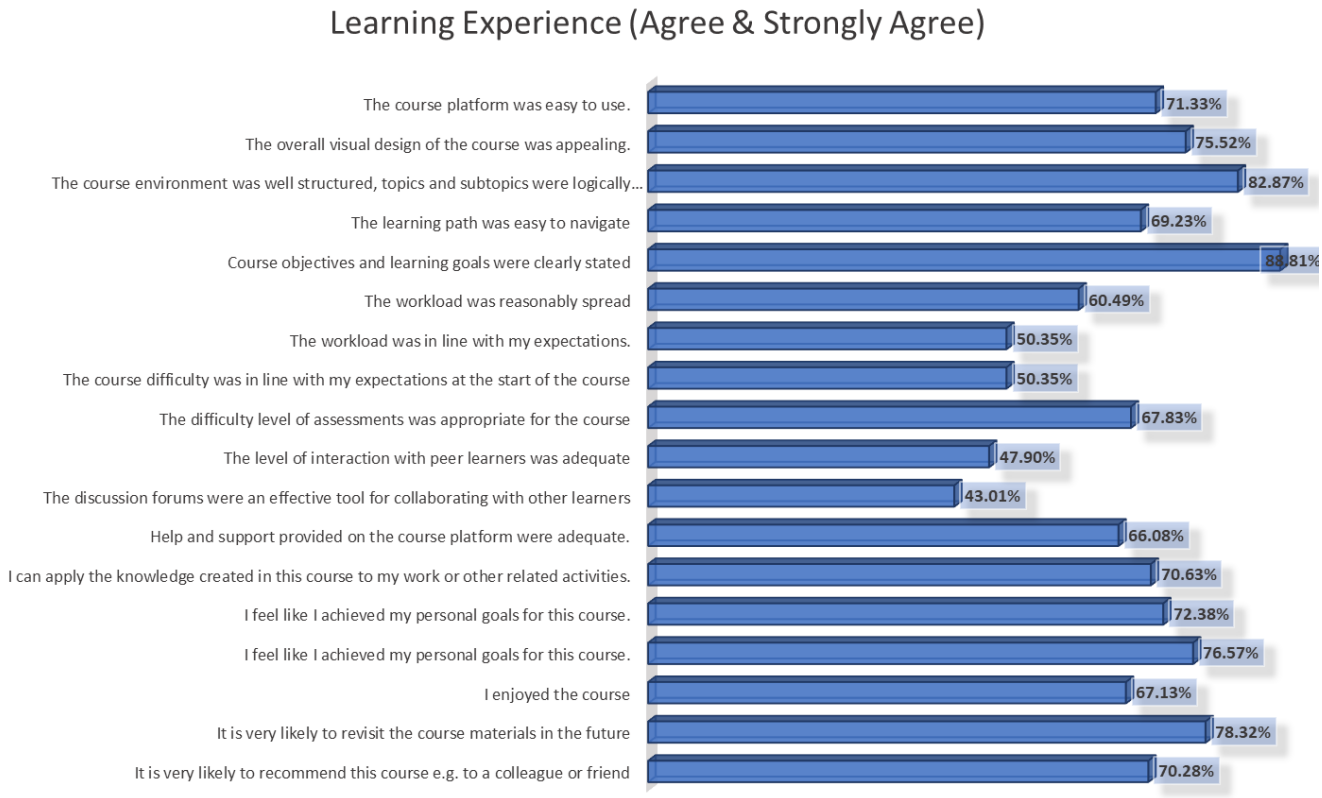

Figure 39: Percentage of Agree & Strongly Agree to 18 Learning Experience statements

The statements with the highest agreement were concerning the clarity of course objectives and learning goals (89.81%), followed by the well-structured course environment and topics/sub-topics arrangement (82.87%), and by participants' intention to revisit the course material in the future (78.32%). The statement with the least positive rating was concerning the appropriateness of discussion forums to support collaboration with other learners (43.01%) and the overall quality of interaction with peers was perceived as less satisfactory (47.90%). Other characteristics of Phase B that were identified as problematic were the workload and the difficulty of the course, that were not in line with participants' expectations (50.35% each). The highest mean scores in terms of categories of statements was in the dimension of Continuance Intention (M=4.068, SD=0.883), followed by Platform Ease of Use (M=4.011, SD=0.741), while Confirmation of Expectations and Satisfaction also scored close to 4.0 (M=3.976, SD=0.743; M=3.906, SD=0.855), and only Learning Experience getting a moderate score (M=3.617, SD=0.720).

Figure 40 presents a comparison of the overall evaluation of the learning experience, expressed as the means in the five dimensions, per targeted group of participants who completed the course. School Teachers appear the most satisfied group of professionals regarding the Platform Ease of Use (M=4.199, SD=0.933), the Satisfaction (M=4.067, SD=0.809), and the Continuance Intention (M=4.253, SD=0.786), whereas the Higher Education Students are the least satisfied group in all dimensions. The complete results of means per targeted group are available in **Appendix C.1**. The one-way ANOVA showed that the differences in mean evaluations in all dimensions between the targeted groups are statistically significant, except from the Learning Experience dimension for which the difference is not statistically significant. The comparison of the differences in the means per pair of groups (Independent samples t-tests) showed that School Teachers' and eLearning

professionals' perceptions differ only on the Platform Ease of Use dimension, School Teachers' and Higher Education Students' ratings differ on all dimension, and eLearning Professionals' and Higher Education Students' opinions differ on Confirmation of expectations, Satisfaction, and Continuance Intention (**Appendix C.1.**)

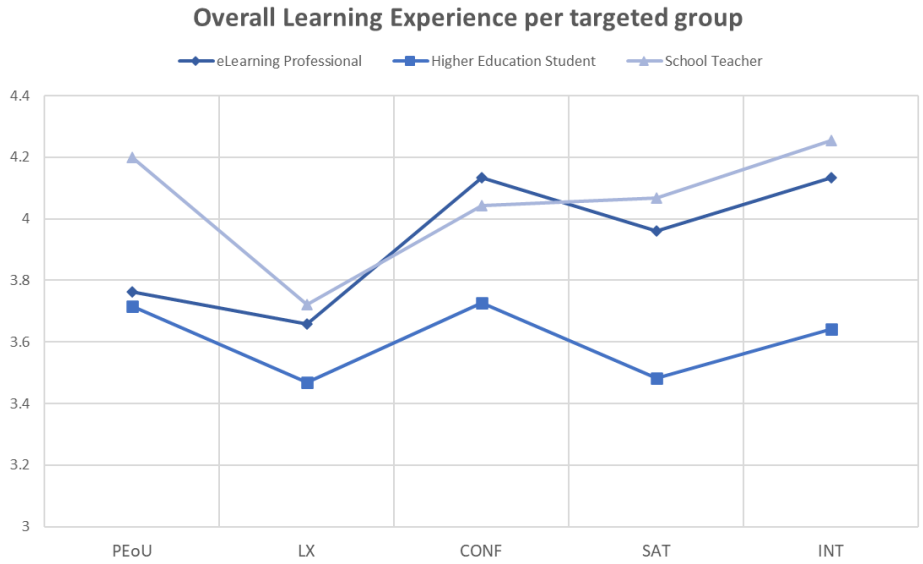

Figure 40: Overall evaluation of the learning experience per targeted group

6.2.1.3 Learning Experience and EDL Competence advancement

Examining the relationship between the overall learning experience of the participants who completed the course and their EDL competence advancement, it was found that there are strong positive relations between Confirmation of expectations (r=0.205, p=0.000), Satisfaction (r=0.198, p=0.000), and Continuance Intention (r=0.167, p=0.005) and EDL Competence advancement, whereas the relationship between Platform Ease of Use is still positive, but it is weak (r=0.147, p=0.013), and there was not statistical relationship detected between Learning experience and EDL competence advancement (r=0.064, p=0.280). Pearson's correlations are available in **Appendix C.1**. Going a step further, results of the multiple linear regression indicated that there was a collective significant effect between the above learning experience dimensions and EDL competence advancement ($F(4, 281) = 3.750$, $p=0.004$, $R^2 = 0.060$). Results are illustrated in Figure 41.

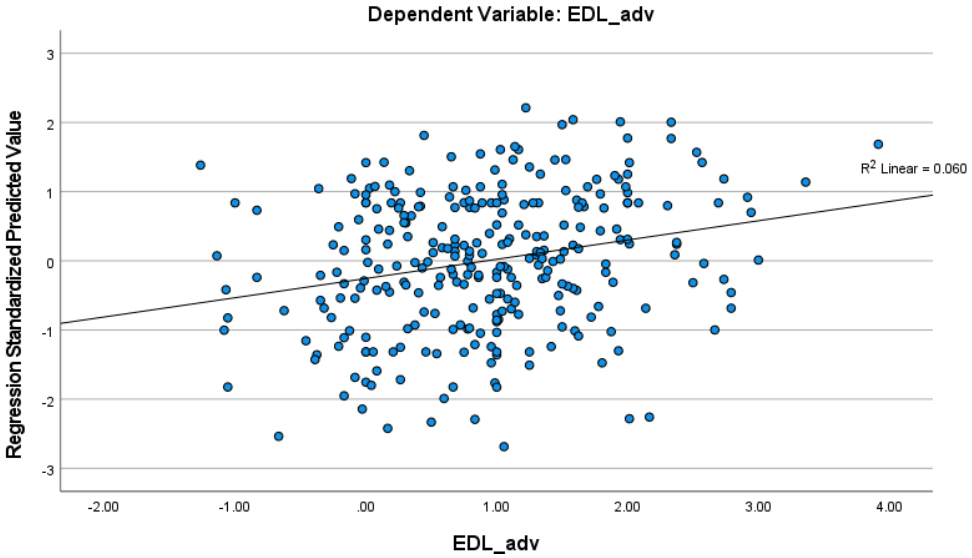

Figure 41: Learning experience effect on EDL competence advancement

6.2.2 Gamification[5]

6.2.2.1 Overall Gamification Experience

To find out the overall gamification experience users had during the course, the 282 users were asked to rate their agreement in 31 statements about 11 psychological outcomes with regards to gamification (**Appendix A.2**). Enjoyment, accomplishment, satisfaction, autonomy, and usefulness were most rated from users with true and very true (Figure 42). The mean overall gamification experience is measured to 3.77, with 110 users having score from 4 to 5 (in a 5-point scale).

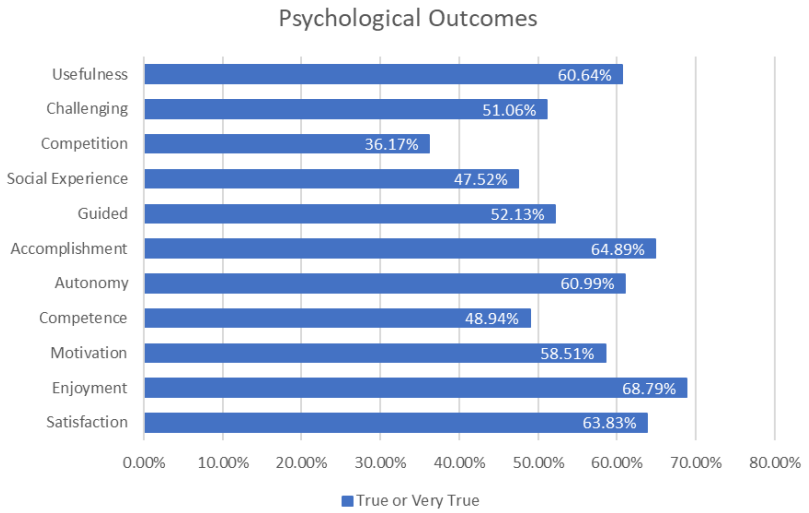

Figure 42: Course-completed users' psychological outcomes of overall gamification experience

a) Overall gamification experience per general characteristics

The mean differences per general characteristics between groups, i.e., gender, English proficiency, comfort with technology, and number of MOOCs enrollment, were not statistically significant.

The one-way ANOVA test revealed that School Teachers' mean overall gamification experience was significantly greater than all the other professional roles' means. The means difference can be found also between users who never completed a MOOC before with those who have completed more than 10 MOOCs, with the first ones having greater overall gamification experience (**Appendix C.2**).

b) Overall gamification experience per previous gamification experience

According to Independent Sample T-Test, the mean overall gamification experience does not differ significantly between users that were already familiar with gamification in teaching and learning and those who were not. The same results appeared between users that had experienced gamified learning experiences in the past and those who had no. On the other hand, the mean overall gamification experience seems to differ significantly between users that had and had not used gamification in their educational design, with those who had used it to have a better overall gamification experience. One-way ANOVA test showed that there is no significant difference for

[5] The gamification experience is studied for 282 participants who completed the course – instead of the 286 – because for four of the participants it was not possible to match their codes to the respective ones from the IMC platform.

overall gamification experience' means among users with different number of participations in gamified MOOCs (**Appendix C.2**).

c) Overall gamification experience per player types

The one-way ANOVA test for the difference of overall gamification experience's means between player types did not show any significant difference between them.

d) Overall gamification experience and attitude towards gamification relationship

After the calculation of Spearman's rho coefficient, among overall gamification experience, attitude towards gamification before and after participating in the MOOC, there was found a strongly positive correlation (0.5<rho=0.650<1) between overall gamification experience and the attitude towards gamification after completing the course, meaning that a positive overall gamification experience can affect positively users' attitude towards gamification (**Appendix C.2**).

6.2.2.2 Per Element

Approximately, half of the users scored from 4 to 5 in a 5-point scale for points, badges, levels, and progress bar's gamification experience, after answering 10 questions per each element (the questions can be found in **Appendix A.2**). Results are summarized in Figure 43, with Progress Bar and Point being the most popular, and leaderboard having the lowest score, with only one third of participants rating it with 4 or 5.

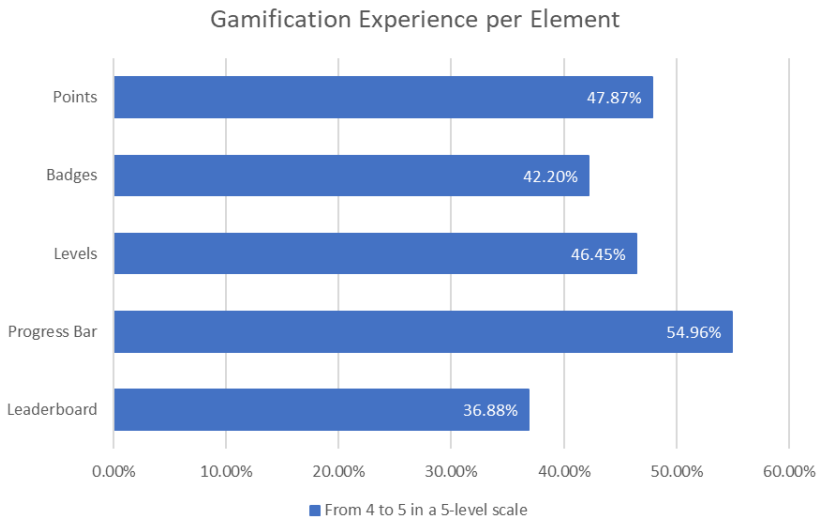

Figure 43: Gamification experience per elements (4 or 5 in a 5-point scale)

Calculating Pearson's correlation of gamification experience among the 5 elements that were used in MOOC showed strongly and very strongly positive correlations, meaning that when a user was having a good and positive experience with one element, he/she will feel the same and with the other ones. Thus, it can be assumed that the elements were implemented correctly and harmoniously within the MOOC (**Appendix C.2**).

a) Gamification experience per element per player types

Among the player types, only the gamification experience of Progress Bar showed a significant mean's difference between Philanthropists and Free Spirit. All the other groups did not differ significantly in any of gamification experience per element.

b) Gamification experience per element and overall gamification experience relationship

According to calculation of Pearson's correlation, overall gamification experience was correlating with every element's experience (**Appendix C2).** Very strongly positive correlation was observed (r=0.881) between Points experience and overall gamification experience (**Figure 44**).

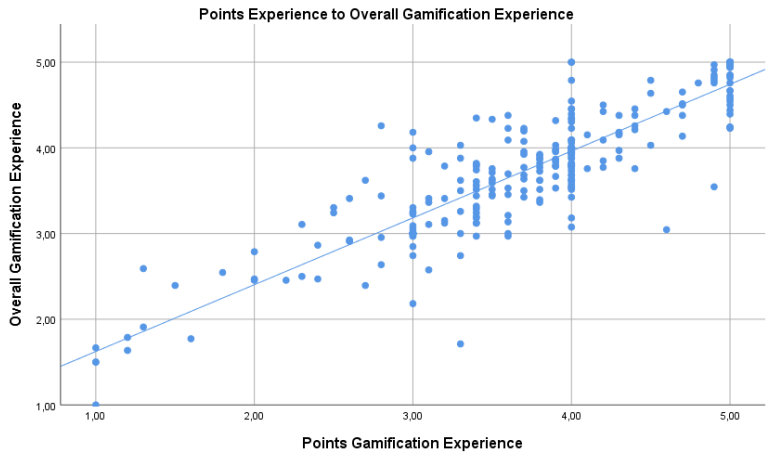

Figure 44: Scatter plot of Points experience to overall gamification experience

Badges and Levels showed also strongly positive correlation with overall gamification experience (r=0.810 and r=0.805 respectively) (**Figures 45 & 46**).

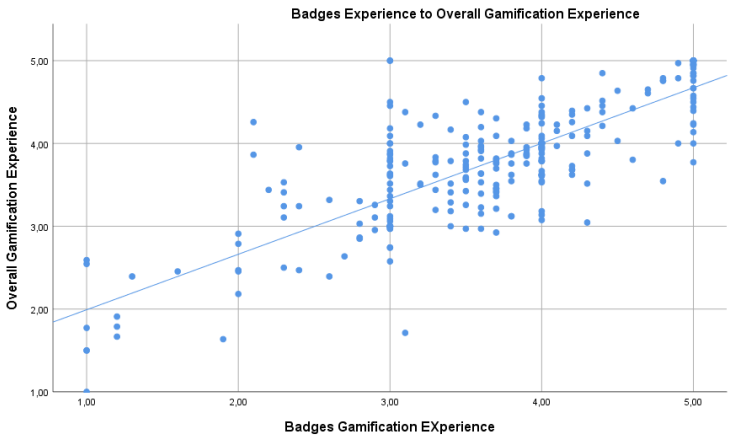

Figure 45: Scatter plot of Badges experience to overall gamification experience

Leaderboard and Progress Bar presented lower but still strong correlation with overall gamification experience (r=0.706 and r=0.655 respectively).

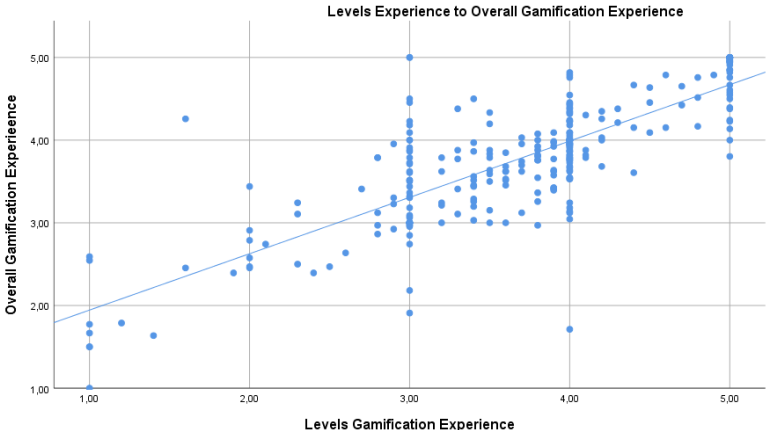

Figure 46: Scatter plot of Levels experience to overall gamification experience

Based on the correlations' results, it is concluded that Points, Badges and Levels affect more positively the users during the course to have a better gamification experience than the other two elements. These findings came to contrast with the fact that Progress Bar scored the most 4-5 (54,96% of users) and it did not seem to affect users the most, regarding to the overall gamification experience.

Figure 47 and **48** show in detail the correlation of the 5 elements with each of overall gamification experience's item. Compared to the other senses of gamification, usefulness seems to affect the experience with elements with the strongest positive way. The sense of competition scored the lowest but still positive correlation with the elements. With competition generally having a more negative sense, it can be assumed that gamification elements were properly implemented in the instructional design of the MOOC, as users did not feel too competitive to discourage themselves. Among the elements, Points had the strongest positive effect and, from all senses, usefulness, motivation, satisfaction, accomplishment, guided, social experience and challenging hit the greatest affection. As it was showed and previously, Progress Bar has the lowest positive correlation. The interesting finding here is that, compared to the other 4 elements, Progress bar hit the lowest score in guided, meaning that other elements helped users more to feel guided during the course. Finally, it is interesting that points helped users feel more competent in EDL than badges or levels.

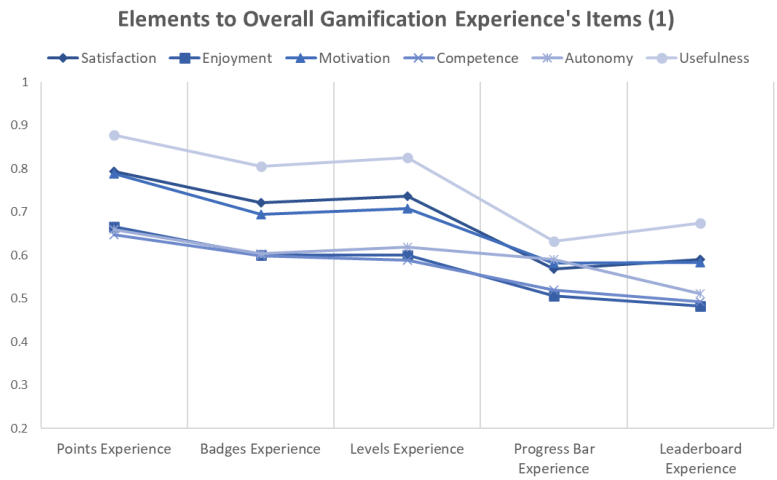

Figure 47: Pearson's correlation r of elements to overall gamification experience's items

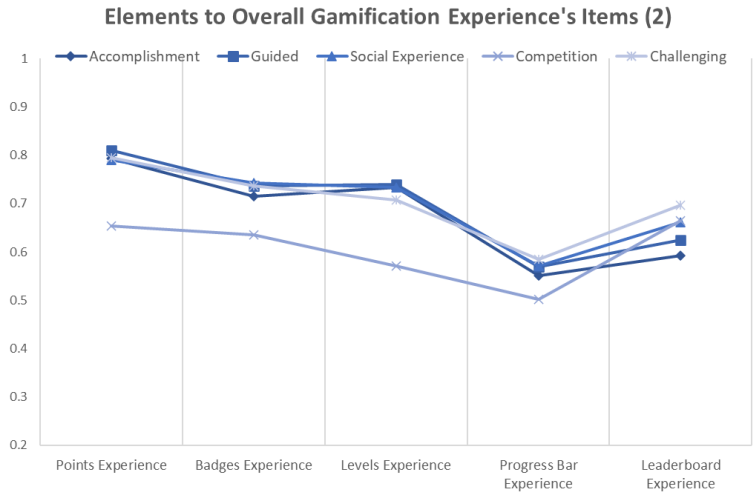

Figure 48: Pearson's correlation r of elements to overall gamification experience's items

c) Gamification experience per element per previous gamification experience

The results were similar with the calculation of overall gamification experience mean differences between the different previous gamification experience. For all the 5 elements, there was not observed any gamification experience significant difference of means neither between users that were familiar with the gamification before the participation in MOOC and those who were not, nor between users with and without experience in gamified learning in the past. Respectively, there were not proved any significant means' difference gamification experience for any element between users with different number of participations in gamified MOOCs. However, 4 from the 5 elements, Points, Badges, Levels and Progress Bar, presented a significant difference between means of users that had used gamification in their educational design and those who did not. Those who had used it showed greater gamification experience regarding those elements.

d) Gamification experience per element and attitude towards gamification relationship

The calculation of Spearman's rho correlation coefficient showed a strong positive correlation between the attitude towards gamification after completing the course and Points, Badges and Levels. Progress Bar and Leaderboard affect moderately the attitude towards gamification after completing the course. The attitude towards gamification before users taking part in the course does not seem to be related to the elements' gamification experience, leading to the same conclusion with the overall gamification experience correlation that the initial attitude towards gamification does not affect the gamification experience users had during the course (**Appendix C.2**).

6.2.3 Actual Engagement in L2A MOOC Phase B (based on analytics)

To measure the engagement of users, total number of Badges and Points along with the average Module Level Experience Tracks are used, as engagement considers to be the actual use, participation, or performance of users. **Figure 49** shows how many course-completed users have earned Badges per Module.

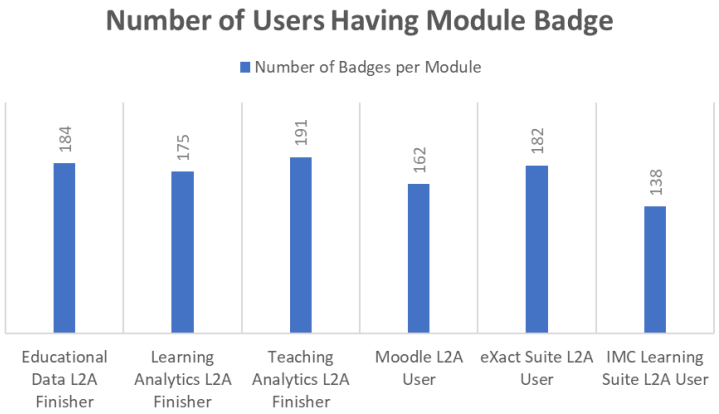

Figure 49: Total number of users per Module Badges

Figure 50 shows how many module badges had been collected by the course-completed users. More than half users have earned 5 or 6 Module Badges while a quarter did not get any, even though they had successfully completed the course. The mean number of Badges per user is at 3.66.

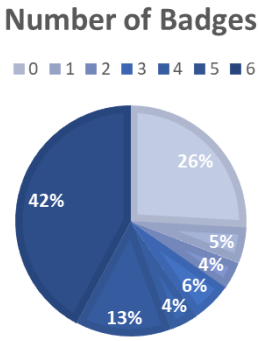

Figure 50: Number of total Module Badges of users

As it is presented in **Figure 51**, the majority of participants who completed the course had reached level 5 of Engagement and Content track. In Test track, almost half of them reached level 5. It is interesting that one in five users stayed at level 0 or 1 to all categories, indicating that although they wanted to complete the course and get the certificate, they only did the necessary things without chasing for earning gamification rewards.

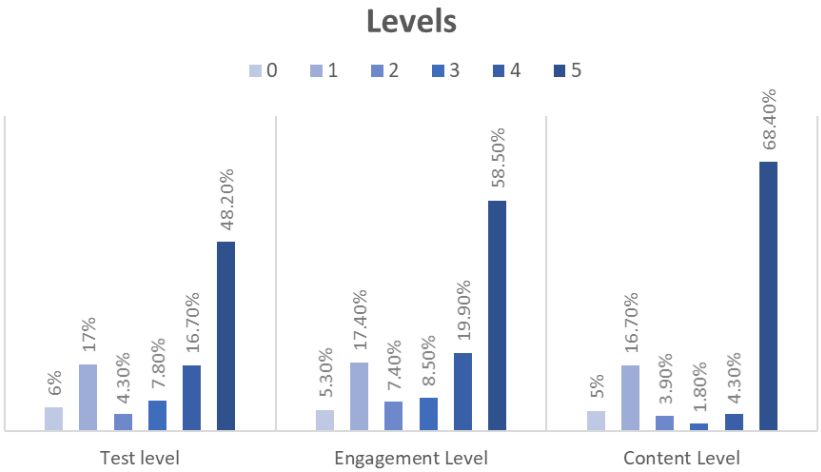

Figure 51: Levels of Test, Engagement and Content tracks

With Points, Badges and Levels being directly connected, with the last two being based on the first one, only Points were examined as engagement.

The correlation's calculation of number of Points with overall gamification experience and attitude towards gamification did not confirm such a relationship. Also, almost unrelated seemed to be the number of Points and gamification experience per element. Although a correlation would be expected, its absence may be due to fact that gamification experience was self-reported while number of Points indicated the actual use. Additional, positive feelings from gamification do not necessarily mean that user would chase gamification rewards.

Examining the means' differences of number of Points between previous gamification experience group found two significant differences. First, users familiar with gamification before participating in MOOC had earned significantly more Points during the course than the users who stated no familiar. Second, users' Points with implemented gamification in their educational design were significantly more than those who had not use it before (**Appendix C.2).** The same mean's difference examination between player types presented no significant differences.

6.3 Outcomes of L2A MOOC Phase B in comparison to L2A MOOC Phase A

In this section we investigate whether there was significant improvement in the Outcomes in Phase B compared to Phase A (Completion and certification, EDL Competence advancement, Learning Experience). As different individuals answered the questionnaires in phases A and B, we will first study the profile of the participants in the two phases and upon similarity, we will then proceed with the comparison of the reported learning experience.

6.3.1 Comparison of Phase A and B participant profiles

In Phase B we observe that the percentage of women who have registered is higher (65.7%) compared to Phase A (55.7%) and the mean age of participants in Phase B is 1.5 years greater (42.8) than in Phase A (40.68). Moreover, in Phase B, the percentage of the participants coming from Greece is even higher that in Phase A (42.89% Phase A - 60% Phase B), while the corresponding percentage of participants coming from Germany has decreased in Phase B (19% Phase A - 13% Phase B).

Moreover, in phase B there is a stable percentage of those coming from the education sector (K12 and Higher Education Institutes) (68.87% Phase A - 67.7% Phase B), while the percentage of those coming from the industry is slightly decreased (16.83% Phase A – 11.3% Phase B). In addition, the mean years of professional experience in Phase B has increased by 2.3 years compared to Phase A.

On the other hand, the educational background of the participants is similar in the two phases of the MOOC run. More specifically, the percentage of participants that hold a master's and/or doctoral degree is the same in the two phases (69.1% phase A – 67.9% phase B), as well as the percentage of participants that hold bachelor's degree (17% phase A – 18.7% phase B) or high school diploma (7.5% in both phases). In both phases the percentage of those who declare High & Very High "English proficiency" is the same (70%), while the reported High & Very High "Comfort with Technology" shows small differences (84.13% phase A - 80.5% phase B). Finally, the reported Initial Educational Data Literacy Competence Level is the same (2 = Advanced Beginner) in both phases of

the L2A MOOC run.

The average number of MOOCs that the participants have started (3.59 phase A and 3.53 phase B), as well as the number of MOOCs that they have completed (2.77 phase A - 2.98 phase B) in both phases are about the same. Furthermore, in both phases there are no differences in the mean reported confidence in learning the material (3.68 phase A – 3.53 phase B) and confidence in completing the MOOC within the time limits (3.74 phase A – 3.76 phase B).

After this brief comparison of participants' profile in the two phases of the Learn2Analyze MOOC, we will proceed with the comparison of the Outcomes, as reported in the respective post-course surveys.

6.3.2 Certification and completion in comparison to L2A MOOC Phase A

In terms of certification and completion, there was a slight increase in L2A MOOC Phase B compared to the respective ones in Phase A. Specifically, the completion rate in Phase B was 2.45% higher than in Phase A. The Summary Independent Samples t-test shown that the difference in mean completion between the two phases is not statistically significant (t(2394)=1.453, p=0.146). Table 8 summarizes the results for completion of the course for both Phase A and B.

Table 8: Participation and Completion Rate for Phase A and Phase B

	Registered Users	**Users of Pre-Course Survey (Enrolled)**	**Users of Post-Course Survey (Completed)**	**Course Completion Rate**
Phase A	1920	1147	235	**20.45%**
Phase B	2971	1249	286	**22.90%**

6.3.3 EDL Competence advancement in comparison to L2A MOOC Phase A

With respect to the EDL Competence advancement in Phase B, it was the same as in Phase A. In particular, in both phases, the participants who completed the course started with a mean initial level 2 (Advanced beginner) in all EDL dimensions and finished with an achieved level 3 (Competent) in all EDL dimensions, which corresponds to an advancement of 1-level. Table 9 shows this result.

Table 9: EDL Competence Level for Phase A and Phase B

	Initial EDL Level	**Achieved EDL Level**	**EDL Advancement Level**
Phase A	2=Advanced Beginner	3=Competent	**1-level up**
Phase B	2=Advanced Beginner	3=Competent	**1-level up**

6.3.4 Learning experience in comparison to L2A MOOC Phase A

Figures 52 and 53 demonstrate the Learning Experience per module for phases A and B, respectively. As we can see, mean values per criterion range between 3.57 and 4.34 for phase A, when the corresponding values for phase B range between 3.83 and 4.37.

Comparing Phases A and B reported *Learning Experience per module*, we recognize statistically significant raise in the mean value of every criterion (1-11) for Modules 6 and 7 (see **Appendix D**), indicating successful interventions to better the quality of the content in these modules, in line with the recommendations for improvement as set out in the Phase A Evaluation Report (Result #13).

Learning Experience per Module

In the post-course survey, participants were asked to rate from 1 to 5 (1=Strongly Disagree, 2=Disagree, 3=Neither agree nor disagree, 4= Agree, 5=Strongly agree) their agreement to 11 statements, concerning their learning experience in each module of the course.

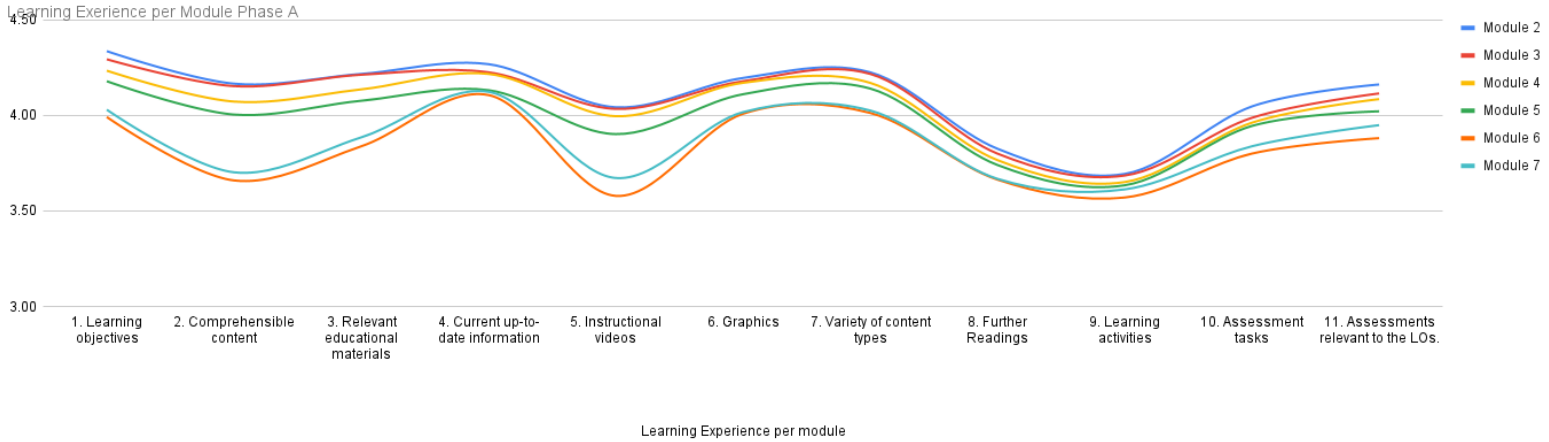

Figure 52: Learning experience per module – L2A MOOC Phase A

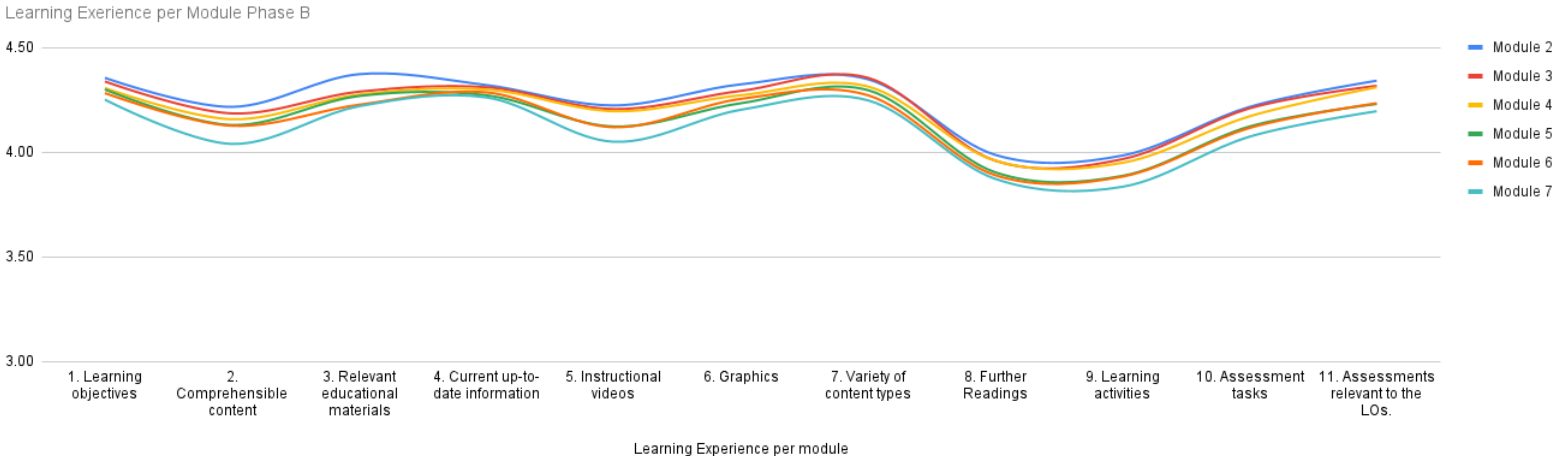

Figure 53: Learning experience per module – L2A MOOC Phase B

Moreover, a statistically significant positive mean difference is observed in all modules for the reported Learning Experience for “The instructional videos per module” (criterion 5), as well as for the “Learning activities” (criterion 9) and the “Assessment tasks” (criteria 10 and 11). These improvements were also reported as necessary in the Phase A Evaluation Report.

Overall Learning Experience

In both Phase A and B post-course survey of the L2A MOOC, participants were requested to rate 18 statements from “Strongly disagree” to “Strongly Agree”, concerning the perceived Learning Experience from the L2A MOOC, as described in **Appendix A.2.** Results for both Phase A and B are presented in Figure 54, were percent agreeing (Strongly agree and Agree) is used.

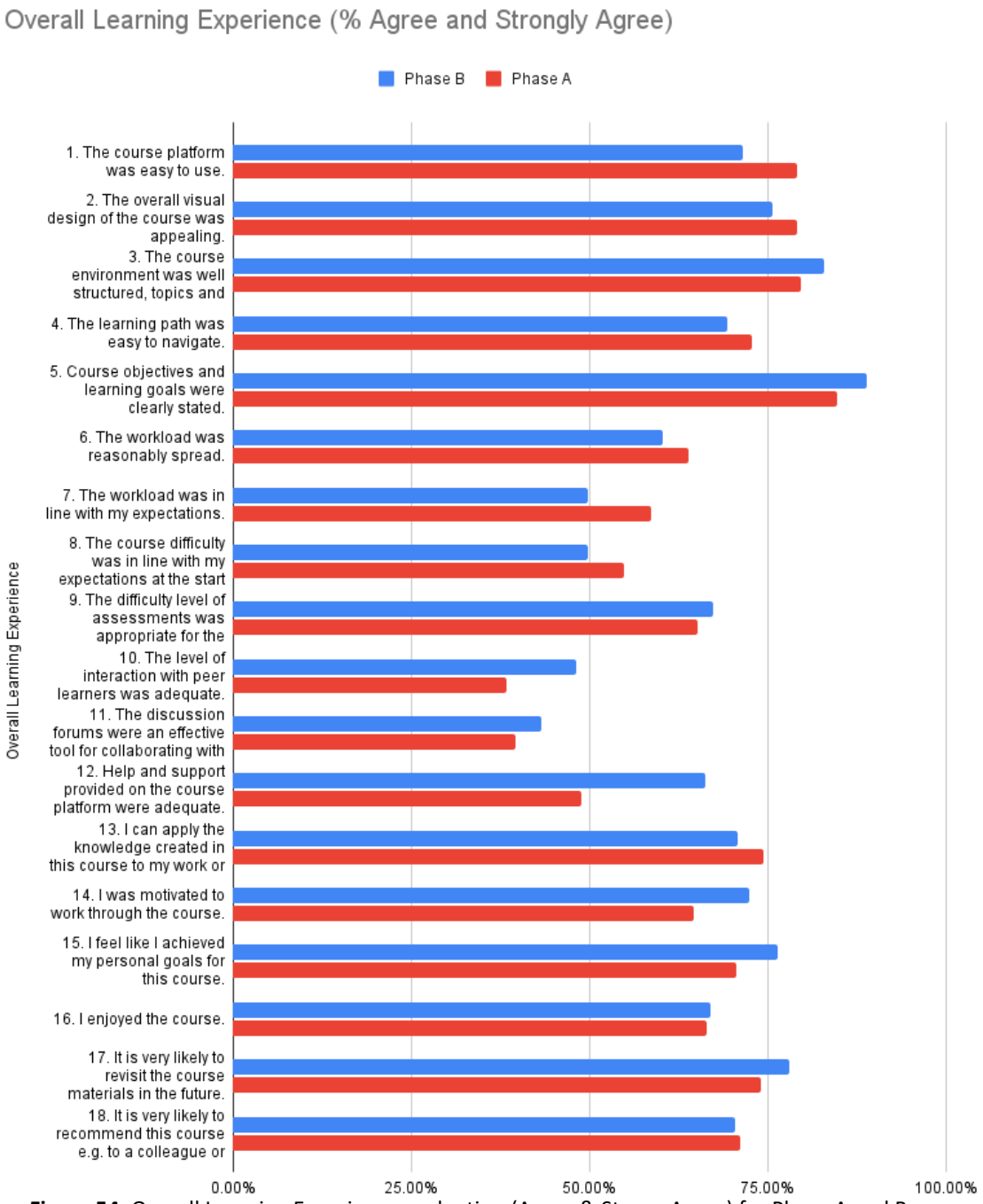

Figure 54: Overall Learning Experience evaluation (Agree & Strong Agree) for Phase A and B

The results from the T-tests between the two phases of the MOOC for the 18 statements of the Overall Learning Experience are presented in detail in **Appendix D**. Statement 1 "The course platform was easy to use" scored significantly lower in the second phase (4.17 phase A – 3.98 phase B). On the other hand, the statements "*12. Help and support provided on the course platform were adequate*", "*14. I was motivated to work through the course*" and "*15. I feel like I achieved my personal goals for this course*" scored significantly higher in the post-course survey of the second phase of the L2A MOOC. More specifically:

- "*12. Help and support provided on the course platform were adequate*" scored 3.54 in phase A and 3.90 in phase B
- "*14. I was motivated to work through the course*" scored 3.72 in phase A and 3.95 in phase B
- "*15. I feel like I achieved my personal goals for this course*" scored 3.86 in phase A and 4.03 in phase B

6.4 Qualitative analysis of participants' comments in relation to their learning experience

In this section we analyze participants' comments in relation to their learning experience; we examine if and how the participants' perception and attitude changed towards the five central themes (as identified in Learn2Analyze MOOC Phase A) compared to the first implementation of the L2A MOOC, as well as their feedback on the new gamification elements added in the Phase B of the MOOC run.

In accordance with Learn2Analyze MOOC Phase A, the post-course survey questionnaire included two open-ended questions so that learners could optionally comment what they enjoyed most about their course experience and what they liked least about taking part in the course. Out of the 286 learners who completed the post-course survey 279 provided feedback on what they liked most and 278 on they liked least about taking part in the course.

In line with the thematic analysis (Braun & Clarke, 2006; Creswell, 2014; Nowell et al., 2017) of survey participants' remarks that we also implemented in Phase A, we focus on the following five central themes:

- ***Course Content*** (learning material included in modules)
- ***Instructional Design*** (content delivery methods, structure, activities such as polls)
- ***Interaction*** (interaction with other participants or instructors, forums)
- ***Assessment*** (Formative Assessment/assessment for learning via Learning Activities/quizzes throughout the course and a Concluding Self-Assessed assignment for each module, as well as Final/Summative Assessment (assessment of learning) via Level A and Level B Certificate)
- ***Platform*** (intuitive use, technical issues, navigation)
- ***Gamification*** (Content Gamification through storytelling, rapid feedback and freedom to fail via quizzes, as well as Structural Gamification through points, levels, badges, progress bar and leaderboard)
- **Other** (comments that are either generic or refer to a different theme)

Table 10 summarizes the number of positive and negative participants' comments per theme for each phase (some comments correspond to more than one themes).

Table 10. L2A MOOC Phase A vs Phase B comments

	Pros		Cons	
	Phase A	Phase B	Phase A	Phase B
Course Content	119	141	78	85
Instructional Design	77	70	65	70
Interaction	18	12	24	17
Assessment	22	50	40	54
Platform	12	5	18	41
Gamification		51		24
Other		47 → 3+17+27* *(from the cons)		13 → 40-27* *(no cons)

In the following sections we present an overview of our key conclusions for each theme compared to Phase A, along with a selection of salient comments, for both positive and negative issues reported by the learners.

6.4.1 Participants' positive comments

In this section we summarize the positive feedback provided by the participants in the question "What did you enjoy most about your course experience?". As depicted in Table 10, the positive comments about both the course material and the assessment are increased compared to Phase A, while there are 51 comments on the new gamification features, as well as 20 comments that are more generic about the course, e.g. "Completing it, sorry but it was a lot of a struggle.", out of which 17 comments emphasize mainly on the positive experience of the learners out of the course.

- "***It was a great way to learn how to be part of an intense online course.***"
- "***It was a valuable professional development opportunity.***"
- "***It was a different experience, very interesting and inspiring.***"
- "*Everything."*

a) Course Content

The majority of the participants commented positively on the course content (as in phase A) and the multifaceted knowledge they acquired about Educational Data Analytics (141 comments in total). The learners were positive for the theoretical part covered in the first modules and valued highly the combination of theory with practice on applying educational data analytics on the three different e-learning platforms, namely, Moodle, the eXact Suite and the IMC Learning Suite (20 comments). The participants also identified and highlighted that the course content was revised and updated in this new version of the MOOC.

- "***It opened a new window to my teaching.***"
- "***I took a taste of the future of education.***"
- "***I've never dealt with such material before!***"
- "***To see beyond data.***"
- "*The elevating level of knowledge it provided.*"
- "***The connection between theory and practice.***"
- "***I learned a lot about different teaching methods that i didn't know before and that are especially good to know for this pandemic period.***"
- "*Practical knowledge in Educational Tools and Data Analyzing.*"
- *"The clarity and usefulness of Modules 2 and 3."*
- "*Practical application in modules 5-7 with attached Excel files.*"
- "*I enjoy that I have learned new things and that motivates me to use them in my classroom.*

- "*I enjoyed most the brand new learning material I had to cope with.*"
- "*Different Insight and that content was revised.*"
- *"The literacy I obtained. I was an absolute beginner.*"
- "*I enjoyed the material in the first three modules, as I felt it was general enough to be applied to any sort of educational situation where data was involved.*"
- "*All the courses were very interesting and I learned many things about Educational Data as well as, Learning and Teaching Analytics. The graphics, instructional videos per module supported my learning and added value to the course content. In addition, I enjoyed the platforms the Moodle and the eXact Suite.*"
- "*The course was very comprehensive, encompassing all features and issues relevant to basic educational data analytics. Furthermore, the LMSs we studied in modules 5-7 have many useful features and great reporting tools.*"

b) Instructional Design

The learners described positive experiences regarding the instructional design of the course focusing both on the structure and the variety of content delivery methods *(70 comments compared to 77 for Phase A).* In accordance to phase A, most of the learners found the videos to be the most engaging learning method (27 comments) while graphics were also positively reported (8 comments).

- ***"I found it challenging enough to keep my interest and the general structure of the course was excellent.***"
- *"Extremely well structured.*"
- "*The course was very well structured. I liked that the same content was analyzed from 3 different angles throughout the course.*"
- *"All the good structured learning material in the different form (like graphics, text, html, videos, ...)*"
- *"It was not a simple presentation of knowledge. It required participation and constant checking of the degree of understanding.*"
- *"The development of internal learning motivations.*"
- *"It was a nicely designed course with multiple learning materials, so it was interesting enough working with it.*"
- "*Thought-stimulating activities and content."*
- *"Good graphics and videos!*"
- *"The variety of content types.*"

c) Interaction

The fora and the interaction with peers were also commented by some participants (12 remarks, slightly less than in Phase A).

- "***Very enjoyable community of learners. Good online support in discussion fora.***"
- "*I enjoyed the variety of content and the discussion with peers.*"
- "*The discussion forums and the showing of progress were very motivating and maintain my interest.*"
- "*Gained new interesting knowledge / exchanged ideas with other colleagues.*"

d) Assessment

The positive remarks on assessment (learning activities/quizzes, self-assessed assignments and upgraded assessment mechanism leading to two levels of Certification of Achievement on Educational Data Literacy) were more than doubled compared to phase A (50 comments in Phase B compared to 22 for Phase A). The quizzes throughout the course were very popular, since most of

the learners reported that it was the feature that they enjoyed the most (36 comments).

- "***I enjoyed the quizzes and the interactive graphic display boards.***"
- "***The self-assessment task of module 6. I was given specific reports to work on (draw data and analyze). I didn't have to figure out mock reports of my own.***"
- "***Taking the test at the end was very satisfying.***"
- "***The on-going assessments to check learning.***"
- "*That you could apply your knowledge directly to the test.*"
- "*Simulation assignments.*"

e) Platform

Only few participants (5 comments, half of Phase A) made pure comments about the platform. Nevertheless, many learners commented positively both the structure of the course and the gamification mechanism.

- "***Neat platform architecture, interesting quizzes, interesting gamification module.***"
- "*The easy use.*"
- "*That the course was well structured and I could see what's expecting me. So I could memorize it better.*"
- "*Being able to experience, first-hand, a MOOC built on IMC.*"

f) Gamification

Learners highly acknowledged the value of the new gamification elements to offer enhanced engagement in several authentic learning activities, as they reported 15 remarks mentioning gamification in general and 35 positive remarks focusing on the learning activities added after each content subtopic in the form of automated quiz test with immediate feedback.

- "***I enjoy an interactive knowledge checks and hints as well as some well-structure lesson ideas. The foremost one is an idea that everyone is given a chance to make more than 1 attempt. It's like giving energy to those who strive learning but often failed to first attempt to work harder and better.***"
- "***The lessons structured in small subjects and I received feedback in every step learning.***"
- "***The organization and flow was amazing!! The best MOOC I have participated in. Rewards and points encouraged me to keep going.***"
- "***… the section of My points and badges!***"
- "*The gamification feature and the quizzes.*"
- "*I enjoyed quiz's solving.*"
- "*I enjoyed most the gamification, explanatory videos, quiz etc.*"
- "*The Gamification section!*"

6.4.2 Participants' negative comments

In this section we summarize the negative comments as derived from participants' answers in the question "What did you like least about taking part in the MOOC?". It is important to note that there are 40 comments that do not correspond to any of the themes, since 27 learners did not report any issue at all that they did not like (e.g. "Nothing", "All was great") and 9 comments refer to the understanding of the English language.

a) Course Content

The negative comments about this theme remain at the same levels compared to Phase A (80 in Phase B compared to 78 in Phase A) and the majority of the remarks regarding course content are

still related to the detailed, quite specialized content provided for the 3 LMS (27 comments), especially since learners could not practise using these tools (8 comments). Many learners again criticized the information overload throughout the whole course (26 comments). The level of difficulty (10 comments), the theoretical part (9 comments), the quality and long duration of some videos (12 comments) as well as the reading material (5 comments) were also reported by some learners. On the other hand, there was only one comment about the overlaps across modules (against 13 comments in Phase A).

- "***Module 5, 6, 7 lacked hands on practice.***"
- "***Module 5-7 Learning via software without direct practice in the program is frankly tiring!***
- "***Platform theory for reports without the option of using those platforms.***"
- "*The workload was heavy; the last 3 modules should have been completely practical.*"
- "*I would like to give us free permission to access moodle, exact, and IMC platform during the mooc's period.*"
- *I'd prefer simulation videos for the 3 programs, to have the possibility to create an account on each platform and experience it that way than having the syllabus displayed in a page.*
- "*I did not like the way that modules 5-7 were set up. I do not think the way the material was presented was helpful for the exams or will be easily retained because the content is so specific that it cannot be applied outside of those LMS situations very easily.*"
- "*A lot of input and the pressure to keep everything in mind to pass the final exam.*"
- "*It was difficult for me but challenging.*"
- "*Huge amount of information.*"
- "*The lengthy yet very interesting module 2.*"
- "*The ambiguity and technical language of module 3.*"
- "*Module 4 - often unclear wording, Modules 5-6-7 were a mere presentation of the respective analytics platforms and could have been dealt more concisely.*"

b) Instructional Design

Comments about the negative experience of the participants mainly related to the needed workload (55 comments compared to 31 in phase A) which reported as higher than the anticipated time commitment according to the syllabus of the course. Nevertheless, the learners did acknowledge the provided extension of the duration of the course, although they would like to be aware from the beginning of the course. There was again some criticism about the multi-level structure (14 comments) of the course, which highly depends on platform's functionality. Some participants (5 comments) referred to other issues such as the nature of the polls and the option to access the course material in .pdf format.

- "***The course was really dense with information, which felt overwhelming at times and hard to retain. It needs to be revisited in order to make the most of it in the future. The learning material took much longer to process than the suggested times. The extension, although welcome, was given too late in the course, when we were nearing towards completion.***"
- "***I think the time frame for completing the courses was not enough. You want more time to understand and get into the logic of the lesson. Fortunately, it was extended.***"
- "*The lack of accordance between the estimated effort in hours and the REAL EFFORT required to get an effective study on the topics.*"
- "*Short period to complete it, especially for us having a job.*"
- *"Fragmentation of learning segments in too many tiny pieces, interrupting reading and working flow.*"
- *"The expanded areas.... SO MANY..."*

- *"The polls that seemed like research rather than for my learning."*
- *"Not enough hands-on activities."*
- *"There is no option for a pdf course material."*

c) Interaction

The remarks for this theme were decreased compared to Phase A (17 comments compared to 24). Nevertheless, some participants expressed their frustration about the lack of actual interaction with their peers, while others seem reluctant about sharing their thoughts (17 comments in total).

- "***The forum posts. Because they don´t trigger collaboration and/or communication, rather the task triggers to gather experience points. In my opinion you can see this on the most redundant, contextless posts of the participants."***
- "*Lack of communication opportunity with peers. The forums are one way with no option for actual interaction.*"
- "*I do not enjoy to post my opinion.*"

d) Assessment

As reported in the post-course survey the most challenging aspects of the assessment mechanism (54 comments in total) was the number of the assessment tasks e.g. Learning Activities/quizzes throughout the course (23 comments also included in gamification theme) and the level of difficulty of the self-assessed assignments based on real-life scenarios (10 comments). Some participants also reported that the elements of the course that they liked the least (8 comments) were the final MCQs in order to successfully complete this course and earn to Level A and/or Level B Certificate of Achievement.

- "***Assessment questions were too many.***"
- "*Some assessments were too complicated, such as creating an excel on your own where there was no guidance how to create an excel.*"
- "*The self-assessment tasks.*"
- "*Not all self-assessment exercises were necessary or good.*"
- "***I found the self-assessed assignments very difficult to interpret what was required; I think I was only happy with one of them although I put in a good deal of effort each time. I expected my attempt to be closer to the exemplary solution but it never was.***"
- "*The final Certificate.*"
- "*In the final questionnaire, I did not remember each module separately to answer. Assessment B seemed easier to me than A.*"
- "*I would really like to get a chance to finish certificate B and it's extremely frustrating if there will be no opportunity to do it in the future.*"

e) Platform

The post-course survey reported 41 comments on platform issues (doubled compared to Phase A with 18 comments) referring mainly to the long page loading time (27 comments), the lack of ease of navigation (8 comments) and the checking for completion (3 comments).

- "***Having to waste double the hours waiting every time I checked the completion tick and for the page to change. Very slow? Too many people? It was horrible.. Lost all the fun due to this..***"
- "*Honestly - I expected 100 hours of work - but not 100 hours of waiting for the screens to show up. The long wait times after the micro quizzes eventually forced me to economise on other course contents in order to finish the course on time - and this is a"&"ctually counter-productive. "*

- "*The learning platform is very unresponsive (no matter what browser I used)*
  I used more time waiting than learning
  Too many clicks were needed to navigate"
- "*Far too many clicks required to navigate through the course.*"
- "*The checkboxes were very tiring and tremendously time-consuming.*"
- "*I should mark as done every unit I accomplished.*"

f) Gamification

With regards to the Gamification theme (24 comments in total) some of the participants did not seem to enjoy the quizzes (8 comments) while others were quite concerned about the increased number of quizzes (8 comments) as well as about their quality (3 comments) and the level of difficulty (4 comments).

- "***The large amount of tests. I didn't enjoy to take a test after every video, text, or any of my actions. It was rather annoying.***"
- "*The quizzes which were many and demanding.*"
- "*The constant quizzes (after every topic were annoying and slow to load).*"
- "*Some quizzes were challenging.*"
- "*Identifying the names of various reports in the quizzes was boring and did not provide any value, especially, if you are not working with the tools on a regular basis.*"
- "*.. And not all quizzes were good.*"

6.4.3 Participants' comments send via e-mail

Under this section we include some of the salient comments of participants sent via email, reflecting their positive experience out of their participation in the course.

"*Thank you for the very interesting course and the material included. I am learning a lot!!*"

"*Congrats for your excellent work!!*"

"*It is my turn to thank you for the opportunity to follow this mooc.*"

"*In retrospect, it was a good idea to deal with the GDPR so intensively at the end of module 2.*

For me it was a good opportunity to dive into the topic. Thank you!"

"*I would like to thank you dearly for offering this course. As a learning designer, I can only imagine the many hours of effort and coordination behind this very comprehensive MOOC. Since I found so much valuable information in one place, I have bookmarked some pages for future reference, and was wondering if access to the course material will remain available for a given period.*"

"*Thank you for organising this course and for the opportunity for my participation.*"

"*I would like to thank you for giving us the opportunity to attend for free the MOOC: Learn to Analyze Educational Data and Improve your Blended and Online Teaching.*"

"*I would like to kindly inform you that I have already attained Level B Certificate of Achievement, and to thank you very much for this interesting journey in the promising terrain of Educational Data Analytics!*"

"*I want to congratulate you for the FANTASTIC work you had done on this course.*"

6.2 System data analysis

In this section we analyse system data to reveal insights into learners' behaviour and participation.

6.2.1 Participants level of engagement with MOOC learning material

During the L2A MOOC Phase B, 2880 accounts were activated, 2186 registered users enrolled in Module 1 Orientation, 1384 enrolled in Module 1 - Part 2: Unlock your MOOC and 1249 participants answered the pre-course survey and unlocked the MOOC content. Table 11 and figure 55 depict the level of engagement with MOOC learning material during Phase B.

Table 11 Progress per module

Progress	Mod 1a	Mod 1b	Mod 2	Mod 3	Mod 4	Mod 5	Mod 6	Mod 7	Mod 8
LEVEL1 (< 20%)	971	556	344	150	101	118	89	78	42
LEVEL2 (20% - 40%)	54	145	140	49	12	16	14	4	13
LEVEL3 (40% - 60%)	19	121	55	14	10	18	3	4	11
LEVEL4 (60% - 80%)	38	281	40	24	7	5	9	2	166
LEVEL5 (> 80%)	1104	281	380	279	253	223	202	199	88
Grand Total	**2186**	**1384**	**959**	**516**	**383**	**380**	**317**	**287**	**320**

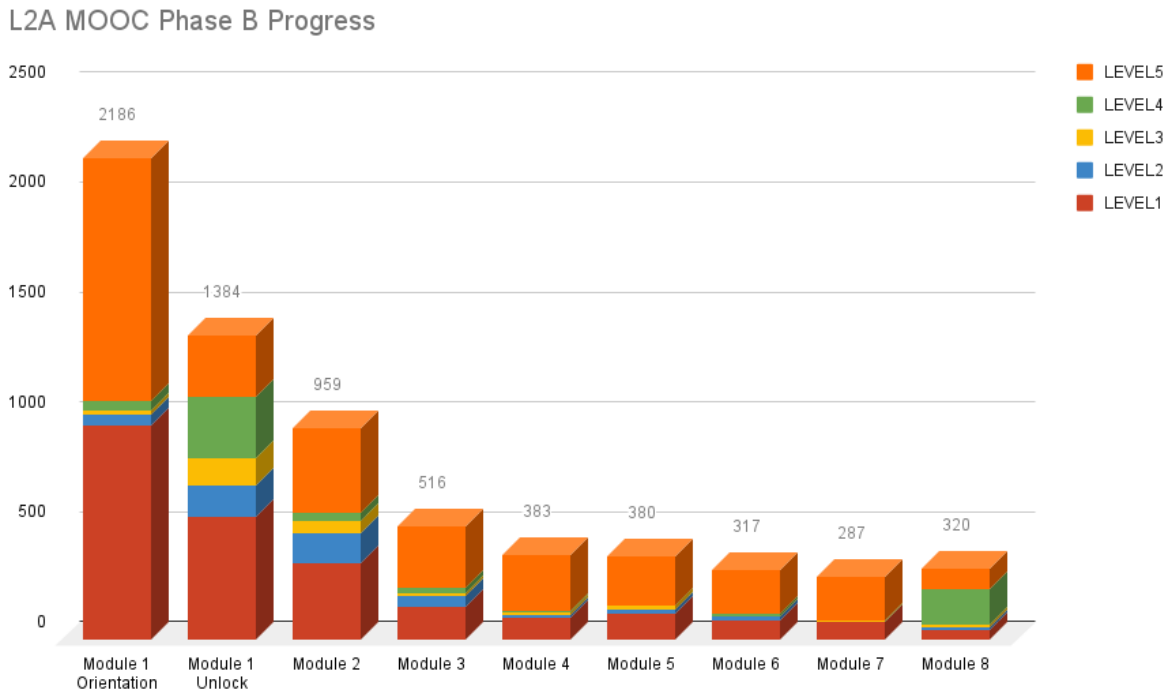

Figure 55 Progress per module

During L2A MOOC Phase B learning activities where in the form of polls and micro-quizzes, as well as collaborative learning activities, i.e. questions in the forum discussions. Furthermore, at the end of each module, there was a concluding self-assessed assignment.

6.2.2 Participants level of engagement with Micro-Quizzes

Table 12 describes the participation in micro-quiz activities per module:

Table 12 Participation in micro-quizzes per module

	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7
Number of micro-quizzes per module	80	28	11	4	26	12
Total participation in micro-quizzes per module	41119	9221	2993	948	5610	2424
Average participation in micro-quizzes per module	514	329	272	237	216	202

Figure 56 shows the number of micro-quizzes per module and the participation per micro-quiz.

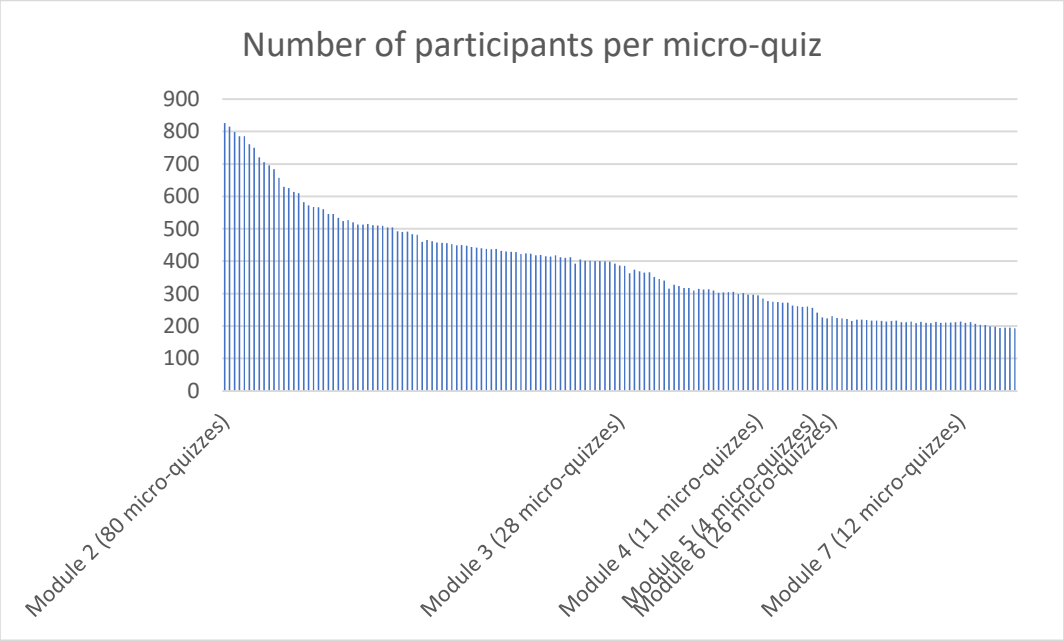

Figure 56 Participation in micro-quizzes

The **average participation in micro-quizzes per module** is shown in the figure 57:

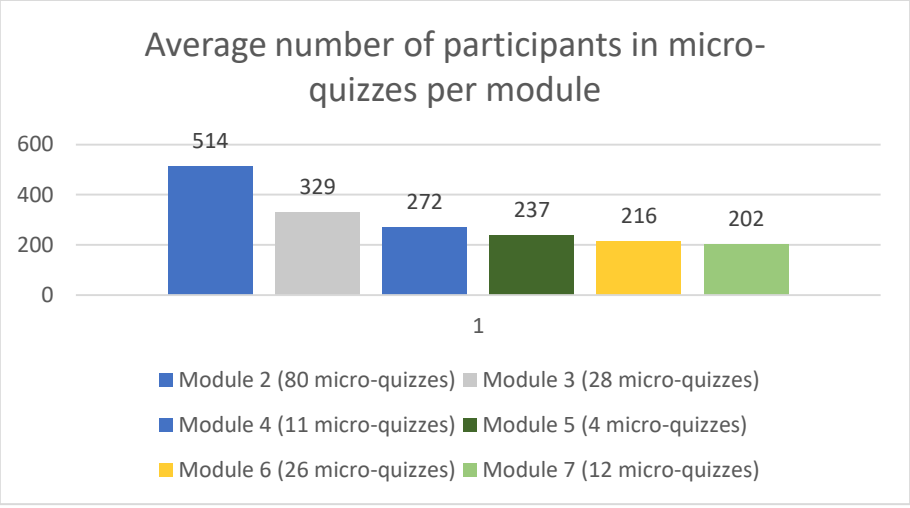

Figure 57 Average participation in micro-quizzes per module

6.2.3 Participation in Polls

During the L2A MOOC Phase B, 46235 poll interactions where reported in a total of 131 poll questions.

6.2.4 Engagement with concluding self-assessed assignment per module

At the end of each module (2..7), participants are asked to conclude a self-assessed assignment. Table 13 and figure 58 present the number of enrolled participants for each module and the respective number of participants that completed the concluding self-assessed assignment.

Table 13 Participants that passed the concluding self-assessed assignment

Progress	**Enrolled in the module**	**Passed self-assessment**	**%**
Module 2	959	302	31.49%
Module 3	516	239	46.32%
Module 4	383	226	59.01%
Module 5	380	177	46.58%
Module 6	317	176	55.52%
Module 7	287	153	53.31%

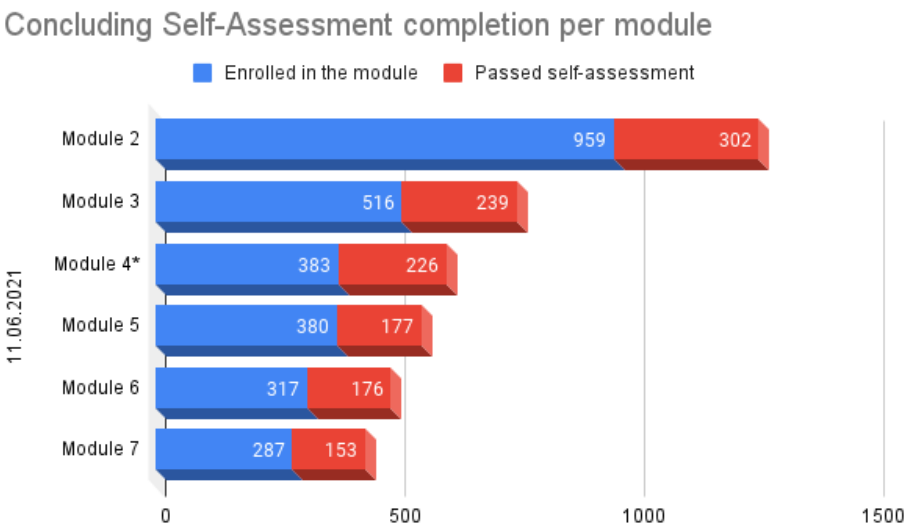

Figure 58 Concluding self-assessed assignment completion

6.2.5 Forum participation

Table 14 indicates the number of collaborative activities per module:

Table 14 number of collaborative activities per module

Module 1	**Module 2**	**Module 3**	**Module 4**	**Module 5**	**Module 6**	**Module 7**	**Module 8**
1	18	10	10	5	7	7	1

Level of engagement in collaborative learning activities (forum participation and workshops) per module is shown in Figure 59:

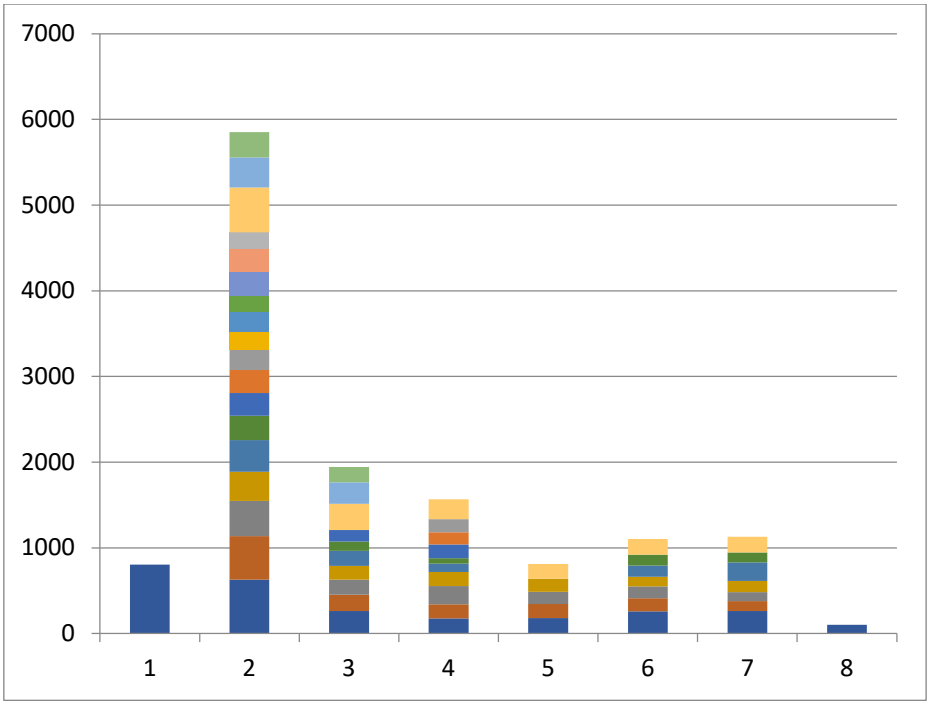

Figure 59 Level of engagement in collaborative learning activities

Different colors indicate the different collaborative learning activities of the module (forum discussions and workshops).

Total participation in collaborative activities per module:

Table 15 Participation in collaborative activities per module

Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7	Module 8
804	5851	1944	1568	812	1103	1129	100

6.2.6 Participation in the Final Assessment (Level A and B)

The table below contains data from the participation in the final assessment (Level A and B)

Table 16 Participation in the final assessment

Assessment module	Enrolled in the module	Passed Final Assessment
Level A Final Assessment	335	280
Level B Final Assessment	206	137

6.2.7 Outcomes of L2A MOOC Phase B in comparison to L2A MOOC Phase A based on system data

In this section we investigate whether there was significant improvement in the Outcomes in Phase B compared to Phase A (engagement in learning activities i.e. quiz learning activities, collaborative activities and assessment activities).

6.2.7.1 Level of Engagement with MOOC learning material

As Tables 17 and 18 indicates, the comparison of learners' progress throughout the L2A MOOC (Level of engagement) does not show any significant difference between the two phases of the MOOC.

Table 17 Level of engagement (Phase A)

Progress	Mod 1	Mod 2	Mod 3	Mod 4	Mod 5	Mod 6	Mod 7	Mod 8
LEVEL1 (< 20%)	568	339	129	94	80	68	73	49
LEVEL2 (20% - 40%)	50	68	18	12	20	9	2	8
LEVEL3 (40% - 60%)	37	34	11	3	6	4	1	6
LEVEL4 (60% - 80%)	179	36	10	9	6	8	8	99
LEVEL5 (> 80%)	487	357	306	270	240	215	206	133
Grand Total	**1321**	**834**	**474**	**388**	**352**	**304**	**290**	**295**

Table 18 Level of engagement

Progress	Mod 1a	Mod 1b	Mod 2	Mod 3	Mod 4	Mod 5	Mod 6	Mod 7	Mod 8
LEVEL1 (< 20%)	971	556	344	150	101	118	89	78	42
LEVEL2 (20% - 40%)	54	145	140	49	12	16	14	4	13
LEVEL3 (40% - 60%)	19	121	55	14	10	18	3	4	11
LEVEL4 (60% - 80%)	38	281	40	24	7	5	9	2	166
LEVEL5 (> 80%)	1104	281	380	279	253	223	202	199	88
Grand Total	**2186**	**1384**	**959**	**516**	**383**	**380**	**317**	**287**	**320**

6.2.7.2 Quiz learning activities

In L2A MOOC phase B, learning activities were added after each content subtopic throughout the course in the form of automated quiz test with immediate feedback. The aim of these new learning activities was to improve the overall learning experience of the participants, provide useful feedback and motivate leaners to re-attempt, as well as to reproduce real-life contexts by using a suitable use case scenario (storytelling), encouraging learners to link theory with practice.

Tables 19 and 20 depicts the participation in quiz learning activities in the two phases of the L2A MOOC. As we can see, the average participation in quiz learning activities increased from 273 learners participating on average in phase A to 387 in phase B, although the comparison is difficult because L2A MOOC phase A included only 17 quiz learning activities in 4 modules, while phase B had 161 micro-quizzes distributed in 6 modules.

Table 19 Participation in micro-quizzes per module (Phase A)

	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7	Total
Number of quizzes per module	3	-	-	4	7	3	17
Total participation in quizzes per module	1321	-	-	1226	1486	605	4638
Average participation in quizzes per module	440	-	-	307	212	202	273

Table 20 Participation in micro-quizzes per module (Phase B)

	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7	Total
Number of micro-quizzes per module	80	28	11	4	26	12	161
Total participation in micro-quizzes per module	41119	9221	2993	948	5610	2424	62315
Average participation in micro-quizzes per module	514	329	272	237	216	202	387

6.2.7.3 Collaboration activities

The comparison of L2A MOOC phases A and B outcomes, based on system data indicates a remarkable increase on the participation in collaborative activities (posts/replies in forum discussions increased from 2970 in phase A to 13311 in phase B, although the discussion topics where the same) (see Tables 21 and 22).

Table 21 Participation in collaborative activities per module (Phase A)

Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7	Module 8	Total
415	1509	206	414	0	106	294	26	2970

Table 22 Participation in collaborative activities per module

Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7	Module 8	Total
804	5851	1944	1568	812	1103	1129	100	13311

7 Areas and recommendations for possible improvement

Table 23. Areas and recommendations of possible improvement

Area	Issue	Possible solution	Priority level
Learners' profile	1. The analysis of participants' profile revealed three major targeted groups namely eLearning Professionals, School Teachers and Higher Education Students.	Leverage this information to properly customize content and activities per group, focusing on K-12 teachers and HE students which were the majority of the participants (approximately 62%). [*MOOC Content/Activities: All Modules*]	High
	2. The Higher Education Students was the most committed group (39.04%, N=57), followed by School Teachers (26.37%, N=164), and by eLearning Professionals (12.24%, N=26). Completion rate is highly impacted by participants' external motives such as earning a certificate.	In order to increase learners' external motives, we incorporated gamification elements, and specifically competence credentials (i.e competence badge) for each of the 6 dimensions of the L2A EDL-CP Framework, for providing evidence of their ability/ prove mastery in this particular competence. To earn the competence credentials, the learner had to achieve all learning outcomes as specified by the respective statements of the dimension. Further improved mechanisms for gaining those credentials might be necessary (e.g., adaptation to competence level). Micro-credentials can play a key role for more flexible and inclusive learning paths, exploiting European Certification Instruments such as the	High

		Europass Digital Credentials Infrastructure (EDCI) to facilitate cross-border portability, recognition and validation [*MOOC Educational Design: Assessment for Certification], [MOOC Educational Design: Gamification*]	
	3. Higher Education Students, reported significantly lower EDL competence advancement, significantly lower satisfaction from the learning experience, yet, had significantly higher completion rates.	Higher Education Students need to become more aware of the importance of EDL. Given that they were the most committed group in completing the MOOC, and despite the lower satisfaction from the learning experience, we need to create more engaging and convincing learning experiences, aligned with their high external motivation. A suggested solution is to complement the course content on EDL with additional semi-worked examples. [*MOOC Content/Activities: All Modules*] [*MOOC Educational Design: Gamification*]	Medium
Content	4. The majority of the participants commented positively on the course content and the multifaceted knowledge they acquired about Educational Data Analytics. They also valued highly the combination of theory with practice on applying	Review detailed, quite specialized and complex LMS-related content that users cannot practice, and combine theory to practice. [*MOOC Content/Activities: All Modules*]	Medium

	educational data analytics on the three different e-learning platforms, namely, Moodle, the eXact Suite and the IMC Learning Suite. Moreover, the participants identified and highlighted that the course content was revised and updated in this new version of the MOOC. Nevertheless, several participants reported being overwhelmed due to the detailed, quite specialized content provided for the 3 LMS, especially since learners could not practise using the tools of all three e-learning platforms, and the information overload throughout the whole course.		
Workload	5. In the pre-course survey, participants reported they were planning to spend **4.3** hours per week on average, but most of the participants in the post-course survey reported they spent close to **4.9** hours on average per module.	The workload needs to be distributed in more weeks, extending the course duration so as to lighten the load of content presented each week. Adaptation of quizzes (i.e., the number of questions per quiz according to the mastery detected) could lead to better targeted and less lengthy assessments [*MOOC Educational Design: Syllabus*]	High
	6. The workload and difficulty of the MOOC were identified as doubtful in Phase B, and not in line with the expectations of half of the participants (who	Provide guidelines and time scheduling that clearly communicate to the learners how much time should be allocated per each module. Consider revising the	Medium

	completed the course). Nevertheless, the learners did acknowledge the provided extension of the duration of the course, although they would like to be aware from the beginning of the course.	expected completion time of tasks and the overall workload of the course. .[*MOOC Educational Design: Syllabus*]	
Assessment	7. The positive remarks on assessment (learning activities/quizzes, self-assessed assignments and upgraded assessment mechanism leading to two levels of Certification of Achievement on Educational Data Literacy) were more than doubled compared to phase A (50 comments in Phase B compared to 22 for Phase A). The quizzes throughout the course were very popular, since most of the learners reported that it was the feature that they enjoyed the most (36 comments). The most challenging aspects of the assessment mechanism was the number of the assessment tasks e.g. Learning Activities/quizzes throughout the course and the level of difficulty of the self-assessed assignments based on real-life scenarios	Self(/Peer)-graded authentic activities should be revised with respect to the expected outcomes, to enable learners to put theory into practice, boost motivation and engage them productively to the content, and enhanced with gamification elements or feedback in the intermediate steps. [*MOOC Content/Activities: All Modules*] Consider integrating an adaptation mechanism for assessment tasks. [*MOOC Educational Design: Assessment for Certification*]	High
Feedback	8. Grading and feedback for	Improve the feedback	High

	human-assessed authentic activities.	mechanism by enhancing it with **peer graded** learning activities. [*MOOC Content/Activities: All Modules*]	
Gamification	9. Learners highly acknowledged the value of the new gamification elements to offer enhanced engagement in several authentic learning activities, also focusing on the learning activities added after each content subtopic in the form of automated quiz test with immediate feedback. Some of the participants did not seem to enjoy the quizzes, while others were quite concerned about the increased number of quizzes as well as about their quality and the level of difficulty.	Leverage this information to properly customize the number, the quality and the level of difficulty of the learning activities/quizzes. *[MOOC Educational Design: Gamification*]	
Platform	10. Navigational issues, multi-level structure of the course and responsiveness of platform.	Decrease the detailed organization of topics and subtopics, providing a clear learning path. Improve navigation and discoverability by using breadcrumb or incorporating a navigation map on top of the screen.	Medium
Interaction with peers	11. The comparison of L2A MOOC phases A and B outcomes, based on system data indicates a remarkable increase on the	To improve collaboration and peer interaction, activities and tasks that are collaborative in nature need to be added, and additional	Medium

	participation in collaborative activities (posts/replies in forum discussions increased from 2970 in phase A to 13311 in phase B, although the discussion topics where the same). Some participants still reported (17 comments compared to 24 in Phase A) lack of actual interaction between peers in the course, while others seem reluctant about sharing their thoughts	motivation for social participation through "group-goals" reflected on gamification elements need to be implemented [*MOOC Educational Design: Gamification*]	

8 Key Performance Indicators

The consortium has defined a number of indicators to monitor the progress of the core project activities. These indicators also support the assessment of the quality of the project outcomes from a quantitative perspective.

WP#	WP PI	
WP4	**PI4.3** Number of MOOC Participants Involved in Phase B	During L2A MOOC Phase B, 2971 initially registered for the course. Out of these, 1249 participants answered the pre-course survey and started the MOOC. These participants were distributed in 69 countries. We consider that an enrolled user has "started the MOOC" only if (s)he submits the Pre-course survey to unlock Modules 2-8.
	PI4.4 Number of MOOC participants successfully completed the MOOC during Phase B	During Phase B, 286 participants successfully completed the L2A MOOC and received at least one certificate of achievement (Level A and/or Level B). **Completion Rate = 22.90%**
	PI4.6 Diversity in demographics of participants Involved in Phase B	**Age diversity:** The age of participants follows the normal distribution with mean value 42.82 and standard deviation 10.640. **Gender diversity:** Although approximately 1.4% of the participants chose not to respond to the question related to their gender, the participants were mostly females (65.7%) than males (32.8%). **Geographical distribution:** Although the participants are distributed in 69 countries around the world, the majority (86%) comes from Greece (N=750), Germany (N=164) and Italy (N=91), which are among the core Learn2Analyse partners' countries.
	PI4.7 Diversity in competence profiles of participants Involved in Phase B	**Educational background:** 56.4% (N=705) of the participants hold a Master's Degree, while 18.7% (N=234) hold a Bachelor's Degree, and

		11.6% (N=145) hold a Doctoral Degree. **English proficiency:** 70.0% reported high (N=874) and very high level (N=442) in English proficiency. **Comfort with technology:** 80.5% reported comfort (N=502) and much comfort (N=503) with technology. **Previous experience with MOOCs:** 55.1% (N=688) reported that they had enrolled in at least 2-4 MOOCs before, and 48.6% (N=607) that they had completed the MOOCs they had enrolled in. **Initial EDL competence level:** The initial EDL competence level for all six dimensions is approximately 2 corresponding to an Advanced beginner. The initial level of EDL competences in all dimensions does not differ significantly between the three groups of professional roles. **Experience with Gamification:** 61.6% (N=770) of the participants reported that they were familiar with gamification in teaching and learning so far, and half of the participants (50.6%, N=632) reported that they had experienced gamification in learning context before. Many participants (44.8%, N=560) reported that they have used gamification in their educational design. However, most of the participants (71.4%, N=892) had never enrolled in a gamified MOOC in the past. **Gamification User Types:**

		The prevailing type is the Philanthropist (24.0%, N=300), followed by the Free Spirit (12.9%, N=161), Achiever (10.9%, N=136), and Socializer (10.5%, N=131). The types of Player and Disruptor were less represented in the participants' sample (3.0%, N=37 and 0.7%, N=9 respectively).
	PI4.8 Diversity in professional experience of participants Involved in Phase B	**Current job sector:** 67.7% (N=845) of the participants reported that they work in K12 and Higher Education, while 11.3% (N=141) come from the Industry/Business sector. 9.8% (N=122) reported "Self/Not-employed" and 11.3% (N=141) reported that they work somewhere else. **Professional role:** 17.0% (N=212) of the participants describe themselves as eLearning Professionals, while 11.7% (N=146) are Higher Education Students, and 49.8% (N=622) are School Teachers. **Years of experience in professional role:** Participants reported on average 12.26 years of experience in professional role. Specifically, School Teachers have 16.83 (SD=6.941) years of professional experience, eLearning Professionals have reported a mean of 8.12 (SD=6.713) years in the professional role, and Higher Education Students have a mean experience of 4.99 (SD=5.042) years. **Years involved in digital teaching and learning:** Participants reported on average 6.96 years of experience in online teaching and learning.
WP5	**PI5.2** Number of recommendations for improvements collected from MOOC participants during Pilot Phase B	In the Post-course survey 278 participants in total, reported **recommendations for improvements**, mainly related to: • the course content (85 comments) • the assessment mechanism: learning activities/quizzes throughout the course (23 comments), self-assessed assignments based on real-life scenarios (10 comments) and the type of the final assessments (8 comments)

<table>
<tr><td></td><td></td><td>

the workload (55 comments)
the discussion forums (17 comments)
the platform functionality (41 comments)
the multilevel structure of the course (14 comments)
hands-on activities by allowing learners to practice using the 3 LMS
option to access course material in .pdf format.

</td></tr>
<tr><td></td><td>PI5.3 Participants' level of educational objectives attainment</td><td>EDL competence level advancement:

The initial EDL competence level for all dimensions, reported in the pre-course survey, was approximately 2 corresponding to an Advanced beginner level. The achieved EDL competence level for all dimensions, reported in the post-course survey is approximately 3 corresponding to Competent level. Thus, the completion of the course resulted in one-level advancement of competences for each EDL competence dimension.</td></tr>
<tr><td></td><td>PI5.4: Participants level of engagement with MOOC learning material (access patterns, timeframe and frequency) (per module, in total)</td><td>Level of engagement with MOOC learning material

The table below depicts the level of engagement with MOOC learning material during Phase B:
<table>
<tr><th>Progress</th><th>Mod 1a</th><th>Mod 1b</th><th>Mod 2</th><th>Mod 3</th><th>Mod 4</th><th>Mod 5</th><th>Mod 6</th><th>Mod 7</th><th>Mod 8</th></tr>
<tr><td>LEVEL1 (< 20%)</td><td>971</td><td>556</td><td>344</td><td>150</td><td>101</td><td>118</td><td>89</td><td>78</td><td>42</td></tr>
<tr><td>LEVEL2 (20% - 40%)</td><td>54</td><td>145</td><td>140</td><td>49</td><td>12</td><td>16</td><td>14</td><td>4</td><td>13</td></tr>
<tr><td>LEVEL3 (40% - 60%)</td><td>19</td><td>121</td><td>55</td><td>14</td><td>10</td><td>18</td><td>3</td><td>4</td><td>11</td></tr>
<tr><td>LEVEL4 (60% - 80%)</td><td>38</td><td>281</td><td>40</td><td>24</td><td>7</td><td>5</td><td>9</td><td>2</td><td>166</td></tr>
<tr><td>LEVEL5 (> 80%)</td><td>1104</td><td>281</td><td>380</td><td>279</td><td>253</td><td>223</td><td>202</td><td>199</td><td>88</td></tr>
<tr><td>Grand Total</td><td>2186</td><td>1384</td><td>959</td><td>516</td><td>383</td><td>380</td><td>317</td><td>287</td><td>320</td></tr>
</table>
</td></tr>
<tr><td></td><td>PI5.5a Participants’ level of engagement with MOOC individual learning activities (access patterns, timeframe and frequency)</td><td>During L2A MOOC Phase B learning activities where in the form of collaborative learning activities, i.e. questions in the forum discussions (see Participants level of engagement with MOOC collaborative learning activities), polls and micro-quizzes. Furthermore, at the end of each module, there was a concluding self-assessed assignment.
Micro-Quizzes

The quizzes throughout the course were very popular as 62315 micro-quizzes interactions where reported in a</td></tr>
</table>

total of 161 quiz learning activities.

The table below describes the participation in micro-quiz activities per module:

	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7
Number of micro-quizzes per module	80	28	11	4	26	12
Total participation in micro-quizzes per module	41119	9221	2993	948	5610	2424
Average participation in micro-quizzes per module	514	329	272	237	216	202

Polls

During the L2A MOOC Phase B 46235 poll interactions where reported in a total of 131 poll questions.

Engagement with concluding self-assessed assignment per module

Module	Enrolled in the module	Passed self-assessment	%
Module 2	959	302	31.49%
Module 3	516	239	46.32%
Module 4	383	226	59.01%
Module 5	380	177	46.58%
Module 6	317	176	55.52%
Module 7	287	153	53.31%

Engagement and Gamification:

More than half of the users earned 5 or 6 Module Badges while a quarter did not get any, even though they had successfully completed the course. The mean number of Badges per user is approximately 3.66. In respect of earned Points, the majority of participants who completed the course reached level5 of Engagement and Content.

<table>
<tr><td></td><td></td><td>In Test Level, almost half of them reached level 5.
On the other hand, according to Test, Engagement and Content Level, 21,7% to 23% stayed at level 0 or 1, indicated that, although they wanted to complete the course, they did only the necessary things without chasing for earning gamification rewards.</td></tr>
<tr><td></td><td>PI5.5b: Participants level of engagement with MOOC collaborative learning activities (access patterns, number of contributions, Social Network Analysis) (per module, in total)</td><td>Forum participation
Number of collaborative activities per module:
<table><tr><th>Module 1</th><th>Module 2</th><th>Module 3</th><th>Module 4</th><th>Module 5</th><th>Module 6</th><th>Module 7</th><th>Module 8</th></tr><tr><td>1</td><td>18</td><td>10</td><td>10</td><td>5</td><td>7</td><td>7</td><td>1</td></tr></table>
Total participation in collaborative activities per module (platform data)
<table><tr><th>Module 1</th><th>Module 2</th><th>Module 3</th><th>Module 4</th><th>Module 5</th><th>Module 6</th><th>Module 7</th><th>Module 8</th><th>Total</th></tr><tr><td>804</td><td>5851</td><td>1944</td><td>1568</td><td>812</td><td>1103</td><td>1129</td><td>100</td><td>13311</td></tr></table></td></tr>
<tr><td></td><td>PI5.6: Participants level of engagement with MOOC learning assessment activities (access patterns, timeframe and frequency) (per module, in total)</td><td>The table below contains data from the participation in the final assessment (Level A and B)
<table><tr><th>Assessment module</th><th>Enrolled in the module</th><th>Passed Final Assessment</th></tr><tr><td>Level A Final Assessment</td><td>335</td><td>280</td></tr><tr><td>Level B Final Assessment</td><td>206</td><td>137</td></tr></table></td></tr>
</table>

9 Conclusions

L2A MOOC Phase B started on 01/02/2021 and was open until 06/06/2021. The main goals of the evaluation of L2A MOOC Phase B were as follows:

a. **Profile** participants *before they start the course* to understand their general and professional background, their motivation to take the course, their previous experience with gamified elements/features in MOOCs, and their background EDL competence: i.e., *who are our learners?*
b. **Profile** participants *after they have completed the course* to understand what the characteristics of the participants who *actively engaged* in the course are: i.e., *who are the EDL certified learners*?
c. **Associate** those profiles with the overall and per module learning and gamification experience, with the completion of the course, and with the achieved advancement in EDL competence: i.e., *how did our certified learners experience their learning and EDL competence development?*
d. **Explore** the differences in learning experience (per module and overall), gamification experience (per module and overall), and learning outcomes (advancement in EDL competence, completion rate) for the different profiles of participants who completed the course.
e. **Examine** the differences in the successful completion of the course (i.e., advancement in EDL competence, completion rates) in Phase B compared to Phase A: *have the updates in the instructional design (i.e., gamification, self-assessed assignment, upgraded assessment mechanism) and the revision in the content of the course (educational material) affected success?*

a. Profiles of participants who enrolled in L2A MOOC Phase B – Who are our learners?

During the time frame the Phase B was available, 1249 participants (females: 65.5%, males: 32.8%; mean age: 42.82 years [SD=10.640]) from 69 countries answered the pre-course survey and started the MOOC. The majority came from Greece (60%, N=750), Germany (13.1%, N=164) and Italy (7.3%, N=91). Most participants (67.7%, N=845) reported that they work in K12 and Higher Education, while fewer (11.3%, N=141) come from Industry/Business, and less from were reported as Self/Non-employed (9.8%, N=122). In particular, 49.8% (N=622) of participants were School Teachers, 17.0% (N=212) were eLearning Professionals, and 11.7% (N=146) were Higher Education Students, with (on average) around 12.26 years of experience in their professional role, and 6.96 years of experience in online teaching and learning.

Overall, the participants who answered the pre-course survey appeared to be motivated, in terms of goal-orientation, self-efficacy, and self-confidence. Specifically, most participants (67.3%, N=841) reported that they were "*Planning to follow the course schedule and complete all activities to earn a certificate of completion*", while the reported basic reasons for taking the course were "[M2] *To extend my current knowledge of the topic*" (84.95%, N=1061) or for "[M1] *personal development*" (76.78%, N=959), characterized as True or Very True by more than 75% of the participants (on average). Participants' estimated GRIT score, i.e., passion and perseverance for long-term and meaningful goals (Duckworth, 2016), was 3.19 (SD=0.468), which is about average. Most participants (54.5%, N=681) reported high self-confidence regarding their *"ability to learn the material in this course*" and most participants (63.7%, N=795) also reported high self-efficacy regarding the

"*possibility of finishing this course according to the anticipated time commitment as defined in the syllabus*". Previous studies showed that students who complete MOOCs tend to have high self-efficacy and self-confidence in their ability to complete the course (Wang and Baker, 2015). The statistical analysis revealed that the three targeted groups (eLearning Professionals, Higher Education Students and School Teachers) differ significantly in: (a) reasons for enrolment, (b) GRIT score, and (c) Self-confidence.

Participants' average self-reported initial EDL competence level for all dimensions of the EDL CF was characterized as "Advanced beginner" (i.e., level 2). With respect to the targeted job roles (i.e., eLearning Professionals (N=212), School Teachers (N=622), Higher Education Students (N=146)), the statistical tests revealed no significant differences in all dimensions of the L2A EDL-CP.

Finally, with respect to participants' gamification profiles, most of them appear to be familiar with gamification in teaching and learning (61.7%, N=770), but had never enrolled in a gamified MOOC before (71.4%, N=892), and all participants appear to be in favor of gamification (M=3.99), with 68.4% (N=854) rating the respective statement as True or Very true. Regarding the gamification user type, most participants are Multitype (38.03%, N=475), followed by Philanthropists (24.0%, N=300) and Free Spirits (12.9%, N=161). Specifically, most School Teachers (38.9%, N=242), as well as eLearning Professionals (39.2%, N=83), and Higher Education Students (31.5%, N=46) were identified as Multitype, followed by Philanthropists (25.2%, N=157) and Achievers (12.5%, N=78) for School Teachers, by Philanthropists (21.2%, N=45) and Free Spirits (18.9%, N=40) for eLearning professionals, and by Philanthropists (28.8%, N=42) and Socializers (19.9%, N=29) for Higher Education Students.

b. Profiles of participants who completed L2A MOOC Phase B – Who are the certified learners?

Out of the 1249 participants who answered the pre-course survey and started the MOOC, 280 passed the assessment for certificate level A (22.4%), 137 passed the assessment for certificate level B (10.97%), and 286 (22.90%) of them answered the post-course survey to receive their certificate of achievement (females: 68.2%, males: 31.5%, mean age: 40.99 [SD=11.794]). A participant had *completed the course* when s/he had received the certificate of achievement (i.e., succeeded the final assessment and submitted both pre- and post-course surveys). Although most participants that completed the course were from Greece (185 participants, 64.7%) followed by Germany (67 participants, 23.4%), the participants from Germany had higher completion rate (40.85%) compared to the participants from Greece (24.67%). With respect to the targeted job roles, the Higher Education Students was the most committed group (39.04%, N=57), followed by School Teachers (26.37%, N=164), and by eLearning Professionals (12.24%, N=26). The statistical difference between "*completers*" and "*droppers*" was significant in all targeted groups.

Additional analysis of the motives of participants who completed the course showed that completers had statistically different ratings on External motives (i.e., M3, M4, and M7) compared to those who did not complete the course. We further explored the statistical difference in the means of reasons for enrolment between the targeted groups, and the one-way ANOVA revealed that the differences are significant for "[M1] *For personal development*", "[M2] *To extend my current knowledge of the topic*", and "[M7] *I was advised or ordered to take part in this course*". Time scheduling (as part of

self-efficacy) also appeared important for the course completion as the analysis showed a strong relationship between the hours per week the participant was planning to spend in the course and the completion rate. Also, it seems that course completion was related to the reported confidence in finishing this course according to the anticipated time commitment as defined in the syllabus. The GRIT score was moderate for all groups and did not differ between the groups.

The perceived initial EDL competence level for all dimensions of the EDL CF was "Advanced beginner" (i.e., level 2) and the respective achieved EDL competence level was "Competent" (i.e., level 3). Thus, completing the course resulted to one-level advancement of competences for each EDL competence dimension. In detail, eLearning professionals and School Teachers have achieved similar level of EDL competence in all dimensions, while the respective concluding competences for Higher Education Students appear to be lower. The one-way ANOVA showed that there were statistically significant differences between the groups in all dimensions, and the additional Independent samples t-test between the couples of the groups (i.e., School Teachers - eLearning Professionals, Higher Education Students - eLearning Professionals, and Higher Education Students - School Teachers) clarified that the statistical differences in the achieved EDL competences between School Teachers and eLearning Professionals are not significant, but the differences in the mean achieved EDL levels of those groups to the Higher Education Students were both found significant in all EDL dimensions.

Participants' perceived learning experience was measured per module and through the course. The evaluation of the learning experience had three parts: (a) learning experience per module, (b) overall learning experience of the course, and (c) participants' comments regarding their learning experience.

In the post-course survey, participants were asked to rate from 1 to 5 their agreement to 11 statements concerning their learning experience *in each module* of the course. The rating per module varies from 3.5 to 4.4 on average (3=Neither agree nor disagree, 4= Agree, 5=Strongly agree)[6]. The analysis of the responses of the 286 participants who completed the course with respect to the first part revealed that participants rated relatively high (score>4) their agreement to statements about the instructional design of the course (learning objectives clearly stated, variety of content types, relevance of the assessments with the LOs), the content (relevant educational materials, current up-to-date information, graphics), as well as the comprehensibility of content, appropriateness of the instructional videos, and the micro-quizzes in all modules, and marginally (score<4 and score>3.8) their agreement to appropriateness of further readings and learning activities in all modules.

Regarding the evaluation of the overall learning experience, participants were asked to rate from 1 to 5 their agreement to 18 statements concerning their (a) general learning experience, (b) platform ease of use, (c) confirmation of expectations, (d) satisfaction, and (e) continuance intention. Based on the analysis of the responses, the statements with the highest agreement were concerning the clarity of course objectives and learning goals (89.81%), followed by the well-structured course environment and topics/sub-topics arrangement (82.87%), and by participants' intention to revisit the course material in the future (78.32%). The statement with the least positive rating was

[6] We define the areas of rating as follows: 1. Relatively high (>4), 2. Marginal (3.8 – 4), 3. Relatively low (3.6 – 3.8)

concerning the appropriateness of discussion forums to support collaboration with other learners (43.01%) and the overall quality of interaction with peers was perceived as less satisfactory (47.90%). School Teachers appear the most satisfied group of professionals regarding the Platform Ease of Use (M=4.199, SD=0.933), the Satisfaction (M=4.067, SD=0.809), and the Continuance Intention (M=4.253, SD=0.786), whereas the Higher Education Students are the least satisfied group in all dimensions.

Finally, most of the participants who completed Phase B of the course (59.8%, N=171) were familiar with gamification in teaching and learning, and more than half of the participants (52.1%, N=149) reported that they had experienced gamification in learning context before. However, more than half of the participants (53.8%, N=154) reported that they had not used gamification in their educational design, and most of the participants (72.0%, N=206) had never enrolled in a gamified MOOC in the past. The completers had a favorable attitude towards gamification, with a mean of 4.29. In terms of gamification user types, the participants who completed Phase B determined themselves as Multitype (34.27%, N=98), followed by Philanthropists (23.08%, N=66), and Socializers (14.0%, N=40). Specifically, School Teachers and eLearning Professionals are mostly Multitype (38.4%, N=63 and 38.5%, N=10 respectively), yet Higher Education Students are mostly Socializers (29.8%, N=17). The second most common gamification type for School Teachers is Philanthropist (24.4%, N=40), for eLearning Professionals it is either Achiever or Free Spirit (19.2%, N=5), and for Higher Education Students it is Philanthropist (22.8%, N=13).

c. Relation of motives and gamification to Course completion and EDL competence advancement in Phase B

The statistical analysis showed that significant correlations to course completion existed for reason "[M3] *obtain a job relevant qualification*", (r=0.066, p=0.020); "[M4] *beneficial for my CV and future job applications*" (r=0.089, p=0.002); and "[M7] *advised or ordered to take part in the course*" were significantly correlated to course completion (r=0.087, p=0.002). It worth mentioning that, in all these three reasons, completers had given a higher rate, and in addition, there was statistically significant difference between completers and droppers for reasons M4 and M7. At the same time, we could not find statistically significant relationship between GRIT score and course completion, yet, Confidence in learning the material had strong negative correlation to course completion (r=-0.068, p=0.016), while confidence in completing the course on time and expected time allocation on the course (i.e., hours per week the participant was planning to spend in the course) were found to have strong positive correlation (r=0.105, p=0.000; r=0.131, p=0.000) to course completion.

Examining the relation between motives and EDL competence advancement, the correlation analysis did not show any statistically significant relationship between the reasons for enrolment and EDL competence advancement, and no statistically significant relation was found between the GRIT scores and EDL competence advancement for the participants who completed Phase B. However, it was found that there is statistically strong negative relationship between self-confidence and EDL competence advancement, but no statistical relationships between time-commitment and progress in EDL competences, as well as between hours planning to allocate in course and EDL advancement.

Regarding the relation of gamification to EDL competence advancement, the calculation of correlation showed a low positive one between overall gamification experience and achieved EDL

competence level (r=0.278). There was not a statistically significant correlation with EDL competence level advancement. Analyzing further the correlation with each item of overall gamification experience, there was found a worth mentioned low, but still stronger than the overall, relationship with the sense of competence that gamification gave to participants (r=0.380).

d. Differences in learning experience and EDL competence advancement per targeted group

Regarding the differences in the mean evaluation of all dimensions in the overall learning experience between the targeted groups, the one-way ANOVA showed that the differences are statistically significant, except from the Learning Experience dimension for which the difference is not statistically significant. The comparison of the differences in the means per pair of groups (Independent samples t-tests) showed that School Teachers' and eLearning professionals' perceptions differ only on the Platform Ease of Use dimension, School Teachers' and Higher Education Students' ratings differ on all dimension, and eLearning Professionals' and Higher Education Students' opinions differ on Confirmation of expectations, Satisfaction, and Continuance Intention. School Teachers appear the most satisfied group of professionals regarding the Platform Ease of Use (M=4.199, SD=0.933), the Satisfaction (M=4.067, SD=0.809), and the Continuance Intention (M=4.253, SD=0.786), whereas the Higher Education Students are the least satisfied group in all dimensions.

e. Comparison of Learning Experience Between Phase A and Phase B

We examined the difference in Learning Experience reported in the post-course survey in the two phases of the L2A MOOC. The Learning Experience from the course attendance was studied from two different perspectives: a) Learning Experience per module, and b) Overall Learning Experience.

The comparison of the Learning Experience per Module between the two phases, indicates significant improvement for Modules 6 and 7 in phase B. In addition, for each Module, there is an improvement in the elements of the "Instructional videos", the "Learning Activities" and the "Assessment tasks". In the Result R13 Evaluation and Recommendations Phase A, the rather problematic comprehensiveness of the content in some modules (especially 6 and 7) was reported, as well as the quality and the duration of some videos. Moreover, Learning Activities and Assessment tasks scored relatively low across all modules. The comparison of the Learning Experience per Module between the two phases of the L2A MOOC shows significant improvements in these areas.

Furthermore, the comparison of the Overall Learning Experience between the two phases, indicates improvement in the help and support that participants received during their interaction with the course platform, as well as increase of the leaners' motivation to work through the course and the feeling of achieving their personal goals for the course. The addition of gamification elements in phase B L2A MOOC, like points and progress bar to provide feedback for content and activities completion and boost motivation, as suggested in Result R13 Evaluation and Recommendations Phase A, seems to have achieved its goals.

f. Qualitative analysis of participants' comments in relation to their learning experience

Based on the Qualitative analysis of participants' comments in relation to their learning experience as collected through the 2 optional open-ended questions included in the post-course survey questionnaire of the Phase B and in comparison to Phase A, overall there is an increase of the

positive comments about the course content and the assessment mechanism, while comments about the challenging experiences of the course still relate to the information overload especially with regards to the 3 LMS, with no option to actually practise using these tools, the instructional design and the required workload and the platform's long page loading times. The pros and cons comments about interaction remain at the same level. With regards to the gamification elements, it is derived that such features were acceptable and reported as very engaging by most participants, though some of the learners seem concerned about the increased number of quizzes and thus the overall workload of the assessment tasks. Finally, there are 44 comments in total collected via the post-course survey as well as many more sent via email describing the positive experience of the learners out of their participation in the Learn2Analyze MOOC.

g. Comparison of engagement between Phase A and Phase B based on system data

The comparison of L2A MOOC phases A and B outcomes, based on system data indicates a remarkable increase of the participation in collaborative activities (posts/replies in forum discussions increased from 2970 in phase A to 13311 in phase B, although the discussion topics where the same). Furthermore, the average participation in quiz learning activities increased from 273 learners participating on average to 387, although the comparison is difficult because L2A MOOC phase A included only 17 quiz learning activities in 4 modules, while phase B had 161 micro-quizzes distributed in 6 modules.

The comparison of learners' progress throughout the L2A MOOC does not show any significant difference between the two phases of the MOOC.

Summary of main conclusions

During the time frame the Phase B was available, 1249 participants (females: 65.5%, males: 32.8%; mean age: 42.82 years [SD=10.640]) from 69 countries answered the pre-course survey and started the MOOC. The majority came from Greece, Germany, and Italy. Most participants work in K12 and Higher Education, with half of them being School Teachers, one-out-of-five being eLearning Professionals, and one-out-of-ten being Higher Education Students, with >10 years of experience in their professional role, and around 7 years of experience in online teaching and learning. Overall, most participants reported that they were "*Planning to follow the course schedule and complete all activities to earn a certificate of completion*", while the reported basic reasons for taking the course were "*To extend my current knowledge of the topic*" or for "*personal development*". Participants reported a moderate GRIT score, and high self-efficacy and self-confidence in their ability to complete the course. The three targeted groups differ significantly in: (a) reasons for enrolment, (b) GRIT score, and (c) Self-confidence. With respect to their gamification profiles, most participants were familiar with gamification in teaching and learning, but had never enrolled in a gamified MOOC before, and all participants were in favor of gamification.

Out of the 1249 participants who answered the pre-course survey and started the MOOC, 286 (22.90%) of them answered the post-course survey to receive their certificate of achievement. The Higher Education Students were the most committed group, followed by School Teachers, and by eLearning Professionals, with the statistical difference between "*completers*" and "*droppers*" being significant in all targeted groups. Completers had statistically different External motives compared to droppers. The analysis showed a strong relationship between the hours per week the participant was planning to spend in the course and the completion rate. The perceived initial EDL competence

level for all dimensions of the EDL CF was “Advanced beginner” (i.e., level 2) and the respective achieved EDL competence level was “Competent” (i.e., level 3). Thus, completing the course resulted to one-level advancement of competences for each EDL competence dimension. The analysis showed statistically significant differences between Higher Education Students and the other two groups in all dimensions, but the statistical differences in the achieved EDL competences between School Teachers and eLearning Professionals were not significant.

Participants’ perceived learning experience was measured per module and through the course. The evaluation of the learning experience had three parts: (a) learning experience per module, (b) overall learning experience of the course, and (c) participants’ comments regarding their learning experience. The rating per module varied from 3.5 to 4.4 on average, with participants being satisfied with the instructional design of the course, the content, the comprehensibility of content, appropriateness of the instructional videos, and the micro-quizzes in all modules. The appropriateness of further readings was somewhat less satisfactory. Regarding the overall learning experience, participants valued the clarity of course objectives and learning goals, the well-structured course environment, and the topics/sub-topics arrangement, expressing their intention to revisit the course material in the future, but seem concerned about the appropriateness of discussion forums to support collaboration with other learners and the overall quality of interaction with peers. School Teachers appear the most satisfied group of professionals regarding the Platform Ease of Use, the Satisfaction, and the Continuance Intention, whereas the Higher Education Students are the least satisfied group in all dimensions. Completers had a favorable attitude towards gamification, determining themselves as Multitype.

The statistical analysis showed significant correlations between external motivations and confidence in completing the course on time and expected time allocation on the course to course completion, while Confidence in learning the material had strong negative correlation to course completion. Examining the relation between motives and EDL competence advancement, the correlation analysis did not show any statistically significant relationship between the reasons for enrolment and EDL competence advancement, while there is statistically strong negative relationship between self-confidence and EDL competence advancement, and a low positive relation between overall gamification experience and achieved EDL competence level.

The comparison of the Learning Experience per Module between the two phases, indicates significant improvement for Modules 6 and 7 in phase B. In addition, for each Module, there is an improvement in the elements of the “Instructional videos”, the “Learning Activities” and the “Assessment tasks”. In the Result R13 Evaluation and Recommendations Phase A, the rather problematic comprehensiveness of the content in some modules (especially 6 and 7) was reported, as well as the quality and the duration of some videos. Moreover, Learning Activities and Assessment tasks scored relatively low across all modules. The comparison of the Learning Experience per Module between the two phases of the L2A MOOC shows significant improvements in these areas. Furthermore, the comparison of the Overall Learning Experience between the two phases, indicates improvement in the help and support the participants received during their interaction with the course platform, as well as increase of the leaners’ motivation to work through the course and the feeling of achieving their personal goals for the course.

The comparison of L2A MOOC phases A and B outcomes, based on system data indicates a remarkable increase on the participation in collaborative activities and in quiz learning activities. Based on the Qualitative analysis of participants' comments, overall there is an increase of the positive comments about the course content and the assessment mechanism, while comments about the challenging experiences of the course still relate to the information overload especially with regards to the 3 LMS. The gamification elements were acceptable and reported as very engaging by most participants, though some of the learners seem concerned about the increased number of quizzes, thus the overall workload of the assessment tasks. Finally, there are 44 comments in total collected via the post-course survey as well as many more sent via email describing the positive experience of the learners out of their participation in the Learn2Analyze MOOC.

References

Antonaci, A., Klemke, R., & Specht, M. (2019). The effects of gamification in online learning environments: A systematic literature review. In *Informatics*, 6(3), 32. https://doi.org/10.3390/informatics6030032

Braun, V., Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77–101. doi: 10.1191/1478088706qp063oa

Chang, J. W., & Wei, H. Y. (2016). Exploring engaging gamification mechanics in massive online open courses. *Journal of Educational Technology & Society*, 19(2), 177-203.

Comer, D. K., & White, E. M. (2016). Adventuring into MOOC writing assessment: Challenges, results, and possibilities. *College Composition and Communication*, 318-359. Retrieved July 6, 2021, from http://www.jstor.org/stable/24633884

Creswell, J. (2014). Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.). Thousand Oaks, CA: Sage. Retrieved from http://www.drbrambedkarcollege.ac.in/sites/default/files/Research-Design_Qualitative-Quantitative-and-Mixed-Methods-Approaches.pdf

Dicheva, D., Dichev, C., Agre, G., & Angelova, G. (2015). Gamification in education: A systematic mapping study. *Journal of Educational Technology & Society*, 18(3), 75-88.

Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the Short Grit Scale (GRIT–S). *Journal of personality assessment*, 91(2), 166-174. DOI: 10.1080/00223890802634290

Floratos, N., Guasch, T., & Espasa, A. (2015). Recommendations on Formative Assessment and Feedback Practices for stronger engagement in MOOCs. *Open Praxis*, 7(2), 141-152. International Council for Open and Distance Education. Retrieved July 6, 2021 from https://www.learntechlib.org/p/151073/

Hew, K. F., Huang, B., Chu, K. W. S., & Chiu, D. K. (2016). Engaging Asian students through game mechanics: Findings from two experiment studies. Computers & Education, 92, 221-236. https://doi.org/10.1016/j.compedu.2015.10.010

Kiryakova, G., Angelova, N., & Yordanova, L. (2014). Gamification in education. *Proceedings of 9th International Balkan Education and Science Conference*.

Marczewski, A. (2015). Even Ninja Monkeys Like to Play: Gamification, Game Thinking and Motivational Desig. In *Gamified UK* (pp. 65–80). http://www.amazon.co.uk/Even-Ninja-Monkeys-Like-Play/dp/1514745666/

McEwen, K. (2013) Getting to know Coursera: Peer assessments. Vanderbilt University. Retrieved July 07, 2021 from: http://cft.vanderbilt.edu/2013/01/getting-to-know-coursera-peer-assessments/

Meek, S. E., Blakemore, L., & Marks, L. (2017). Is peer review an appropriate form of assessment in a MOOC? Student participation and performance in formative peer review. *Assessment & Evaluation in Higher Education*, 42(6), 1000-1013. DOI: 10.1080/02602938.2016.1221052

Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in higher education*, 31(2), 199-218. DOI: 10.1080/03075070600572090

Nowell, L.S., Norris, J.M., White, D.E. and Moules, N.J. (2017) *Thematic Analysis: Striving to Meet the Trustworthiness Criteria. International* Journal of Qualitative Methods, 16, 1-13. doi: 10.1177/1609406917733847

Romero-Rodriguez, L. M., Ramirez-Montoya, M. S., & González, J. R. V. (2019). Gamification in MOOCs: Engagement application test in energy sustainability courses. *IEEE Access*, 7, 32093-32101. DOI: 10.1109/ACCESS.2019.2903230

Tondello, G. F., Wehbe, R. R., Diamond, L., Busch, M., Marczewski, A., & Nacke, L. E. (2016). The gamification user types hexad scale. In *Proceedings of the 2016 annual symposium on computer-human interaction in play (CHI PLAY '16)*. ACM, New York, NY, USA, 229–243. DOI: https://doi.org/10.1145/2967934.2968082

Ventista, O. M. (2018). Self-assessment in massive open online courses. *E-Learning and Digital Media*, 15(4), 165-175. DOI:10.1177/2042753018784950

Wang, Y., & Baker, R. (2015). Content or platform: Why do students complete MOOCs. MERLOT *Journal of Online Learning and Teaching*, 11(1), 17-30.

Wilkowski, J., Russell, D. M., & Deutsch, A. (2014). Self-evaluation in advanced power searching and mapping with google MOOCs. In *Proceedings of the first ACM conference on Learning@ scale conference* (L@S '14). ACM, New York, NY, USA, 109–116. DOI: https://doi.org/10.1145/2556325.2566241

Appendix A – Instruments

Appendix A.1 – Pre-course Survey

Section 1 – Invitation

Learn2Analyze MOOC Pre-Course Survey

You are invited to participate in the Learn2Analyze MOOC Pre-Course Survey. Your responses to this survey will help us to evaluate the Learn2Analyze MOOC and improve it in future versions.

The survey is expected to take approximately 25 minutes to complete. You will be asked to provide answers to a series of questions related to your demographics and general background, your motives for enrolling in the Learn2Analyze (L2A) MOOC and your existing competence level per "Educational Data Literacy (EDL) Competence Profile (CP) Statement" for each competence dimension of the Learn2Analyze EDL Competence framework. Upon completion of the Pre-Course Survey you will receive the Learn2Analyze MOOC "Unlock Code". After the course opening (1st of March 2021), you can return to the Learn2Analyze MOOC (https://learn2analyze.imc-learning.de) and use this code as a key to unlock the Learn2Analyze MOOC content.

We greatly appreciate your willingness to share your time by participating. Your responses to these surveys will help us to improve the quality of the learning experience and to better our course offerings.

On behalf of the Learn2Analyze Consortium, we express our sincere thanks for your participation in our survey acknowledging that your insights on the questions in this survey will prove invaluable.

1. How did you learn about the Learn2Analyze MOOC?
    - A Mailing List
    - A Facebook Group posting
    - A LinkedIn Group posting
    - A Twitter Group posting
    - A Ning Group posting
    - A Blog Posting
    - A Newsletter Posting
    - An Article Posted Online or Printed
    - A MOOC Aggregator or Course Catalogue Posting
    - A Physical Event

- Other

2. Please define (name which one)

   _____

Section 2 - Consent form to Participate in Web-based Survey

Title of Survey: Learn2Analyze MOOC Pre-course survey Questionnaire

Purpose and Procedure:
The Learn2Analyze (L2A) is an Academia-Industry Knowledge Alliance for enhancing Online Training Professionals' (Instructional Designers and e-Trainers) Competences in Educational Data Analytics. L2A is an action co-funded by the European Commission through the Erasmus+ Program of the European Union (Cooperation for innovation and the exchange of good practices - Knowledge Alliances, Agreement n. 2017-2733 / 001-001, Project No 588067-EPP-1-2017-1-ELEPPKA2-KA).
More information about the project is available at www.learn2analyze.eu.

Please note:
1. The survey will be carried out from 01/02/2021 to 01/05/2021.
2. Before you proceed to the survey questions, you will be asked to indicate your consent.
3. Should you decide you do not wish to further participate, you may leave the survey at any time, just by exiting your browser.
4. The questionnaire consists of 6 sections and needs approximately 20-25 minutes to be completed.
5. The first section includes the consent form for participating in the survey.
6. The second section includes a set of questions about demographics and general background.
7. The third section includes a set of questions about your background and attitude towards Gamification
8. The fourth section includes a set of questions on your motives for enrolling in the Learn2Analyze (L2A) MOOC.
9. The fifth section includes a set of questions on your existing competence level per "Educational Data Literacy (EDL) Competence Profile (CP) Statement" for each competence dimension of the Learn2Analyze EDL Competence framework.
10. In the final section, you will be asked for your email address in order to receive the Learn2Analyze MOOC "Unlock Code". You will need it as a key to unlock the Learn2Analyze MOOC content, after the 1st of March 2021, when the course starts.

Legal basis for processing personal and sensitive data:
Personal Data:
In connection with this research, the Learn2Analyze Consortium's collection and processing of the following Personal Data is lawful based on consent (Article 6.1(a), GDPR):
□ Name, Email Address
□ Education Information
Sensitive Data:
In connection with this research, the Learn2Analyze Consortium's collection and processing of the following Sensitive Data is lawful based on consent (Article 9.2(a), GDPR):
□ Gender

Potential Benefits:
There are no direct benefits for participating in the survey. The survey results will help us evaluate the L2A MOOC and improve its future versions.

Potential Risk or Discomforts:
We do not perceive any risk or discomfort in the completion of the survey.

Storage of Data:
The survey is completed in a Google Docs form and stored in a secure GoogleDrive folder under the e-mail l2a.r12.survey@gmail.com, for the time required by the purposes described in this document, for maximum 2 years.

Data transfer outside the European Union:
We may share some of the data collected with services located outside the European Union, in particular through the aforementioned Google services. The transfer is authorized on the basis of provisions of the European Union, on the adequacy of the protection offered by the EU-US privacy shield scheme.

Right to Withdraw:
Your participation in this survey is voluntary. You are under no obligation to complete the survey and you can withdraw from the survey prior to submitting it. If you do not want to participate simply stop participating or close the browser window. You can simply exit the Web Browser without saving your responses, and they will not be recorded.

Rights of research participants:
You have the right to request access to, a copy of, rectification, restriction in the use of, or erasure of your information in accordance with all applicable laws, contacting the lead Learn2Analyze researcher for this survey in l2a.r12.survey@gmail.com. The erasure of your information shall be subject to the Learn2Analyze Consortium's need to retain certain information pursuant to any other identified lawful basis.

If the Learn2Analyze Consortium's use of your information is pursuant to your consent, you have the right to withdraw consent without affecting the lawfulness of the Learn2Analyze Consortium's use of the information prior to receipt of your request.
If you think your data protection rights have been breached you have the right to lodge a complaint with your national Data Protection Authority (DPA).

Participant Concerns and Reporting:
If you have any questions concerning the survey or experience any discomfort related to the survey, please contact the lead Learn2Analyze researcher for this survey in l2a.r12.survey@gmail.com

Conflict of Interest:
We do not perceive any conflicts of interest in the development of this survey.

Compensation:
There is no compensation for participants in this survey.

Confidentiality:
The only people processing your input will be the researcher(s) involved in the Learn2Analyze project. The researcher(s) undertake to keep any information provided herein confidential, not to let it out of our possession and to report on the findings from the perspective of the entire participating group and not from the perspective of an individual. Please note that confidentiality cannot be guaranteed while data are in transit over the Internet.

How will results be used:
The results of the survey will be used for evaluating the L2A MOOC. The results from the survey may be used for research study, for scholarly purposes only and might be presented in conferences, published in journals or articles for educational purposes.
By indicating consent to participate in this survey you also indicate consent for the possible secondary use of this data at a later date if we decide to undertake a further longitudinal study for the enhancement of the Learn2Analyze MOOC.

Debriefing and Dissemination of Results:
The final report will be made publicly available through the official website of the project www.learn2analyze.eu.
On behalf of the Learn2Analyze Consortium, we would like to sincerely thank you for your participation in our survey acknowledging that your insights on the questions in this survey will prove invaluable.

Selecting “I Agree” below indicates that:

You have read the above information;
You voluntarily agree to participate in this survey;
You understand the procedures described above;
You give consent for the use of your Personal Data for the purposes outlined in this notice;
You give consent for the use of your Sensitive Data for the purposes outlined in this notice;

You are at least 18 years of age.

- I Agree

Section 3 – Create your Unique Code ID

To create your unique code ID please use:

1. The first letter of your first name (e.g. U)
2. The last 2 digits of your cell phone (if none use 00) (e.g. 17)
3. Your month of birth (e.g. 03)
4. The first letter of your middle name (if none, use X) (e.g. M)
5. The first letter of city/town you were born in (e.g. V)

(The above example would generate the unique code ID: U1703MV)

Please provide your unique code ID as per instructions:

_____

Section 4- Demographics & General Background

You will be asked to provide answers to a series of questions related to your demographics and educational/professional background.

Number of questions in current section: 12

1. What is your year of birth? Please enter (YYYY)

   _____

2. What is your gender?
   - Female
   - Male
   - I prefer not to answer

3. Please specify your country of residence.
   (Select from drop-down list)

4. What is the highest level of education you have completed?
   - High School Diploma (or equivalent)
   - Associate degree / technical diploma - occupational / technical / vocational program
   - Associate degree - academic program
   - Bachelor's degree (e.g., BSc, BA, AB, BS, BPS)
   - Master's Degree (e.g., MA, MS, MSc, MEng, MEd, MSW, MBA)
   - Professional School Degree (e.g., JD, MD, DDS, DVM, LLB)
   - Doctoral Degree (e.g., PhD, EdD)
   - Other

5. What is your current job sector?
   - Self-employed
   - Large (>100 people) for-profit company
   - Small (>100 people) for-profit company
   - Large (>100 people) non-profit
   - Small (<100 people) non-profit
   - K-12 Education
   - College
   - University
   - Governmental Education Agency
   - Other Governmental Agency
   - Not-employed
   - Other

6. What is your professional role? (select all that apply)
   □ Higher Education Students
   □ Professional Instructional Designer of Online and/or Blended Courses
   □ (e-) Tutor of Online and or Blended Courses
   □ School Teacher in K-12 Education
   □ Professional involved in supporting Teaching & Learning in Higher Education and/or Professional involved in supporting Professional Development

□ Professional involved in supporting Educational Data in Higher Education and/or Professional Development
□ Manager in a Higher Education Institute
□ Manager in a Professional Development Service Provider
□ Manager in an e-Learning Service Provider
□ Manager in a Governmental Education Policy Making Institute
□ Academic involved in teaching Higher Education Courses on Digital Learning and/or Learning Technologies
□ Academic involved in teaching Higher Education Courses specifically for Instructional Designers and/or (e-) Tutors
□ Academic involved in teaching Higher Education Courses specifically for Educational Data Literacy
□ Researcher in Digital Learning and/or Learning Technologies
□ Researcher in Instructional Design of Online and/or Blended Courses
□ Researcher in Educational Data Literacy
□ Other

7. How many years are you involved in this role?
   - 1-5
   - 6-10
   - 11-20
   - 21+

8. How many years are you involved in the field of Digital Teaching and Learning?
   - 1-5
   - 6-10
   - 11-20
   - 21+

9. On a scale from 1 (low) to 5 (high), please rate your English proficiency

10. On a scale from 1 (low) to 5 (high), please rate your comfort with Technology

11. In how many MOOCs have you enrolled?
    - None
    - 1
    - 2-4
    - 5-10
    - >10

12. How many have you completed?
    - None
    - 1
    - 2-4
    - 5-10
    - >10

Section 5 – Gamification

You will be asked to provide answers to a series of questions related to your background and attitude towards Gamification, as well as, to rate your intrinsic and extrinsic motivation that determines your player type.

Number of questions in current section: 6

1. Are you familiar with gamification in teaching and learning?
    - Yes
    - No

2. Have you experienced gamified learning experiences in the past?
    - Yes
    - No

3. In how many gamified MOOCs have you take part?
    - None
    - 1
    - 2-4
    - 5-10
    - >10

4. Have you used gamification in your educational design?
    - Yes
    - No

5. Attitude towards Gamification
   Please select the number [1..5] that best describes what you think.

	Not at all true	2	Somewhat true	4	Very true	Not Applicable
My attitude towards gamification is favorable.						

6. Gamification User Types based on intrinsic and extrinsic motivation
   Please rate your agreement to the following statements from 1= "Strongly Disagree to 7= "Strongly Agree":

	1	2	3	4	5	6	7
SOC1. Interacting with others is important to me.							
PHIL1. It makes me happy if I am able to help others.							
FS1. It is important to me to follow my own path.							
SOC2. I like being part of a team.							
DIS1. I like to provoke.							
PR1. I like competitions where a prize can be won.							
SOC3. It is important to me to feel like I am part of a community.							
FS2. I often let my curiosity guide me.							
DIS2. I like to question the status quo.							
PR2. Rewards are a great way to motivate me.							
FS3. I like to try new things.							
AR1. I like defeating obstacles.							
PHIL2. I like helping others to orient themselves in new situations.							
DIS3. I see myself as a rebel.							
SOC4. I enjoy group activities.							
AR2. It is important to me to always carry out my tasks completely.							
DIS4. I dislike following rules.							
PHIL3. I like sharing my knowledge							
AR3. It is difficult for me to let go of a problem before I have found a solution.							
PR3. Return of investment is important to me.							
FS4. Being independent is important to me.							

AR4. I like mastering difficult tasks.							
PHIL4. The well-being of others is important to me.							
PR4. If the reward is sufficient, I will put in the effort.							

Section 6 – Motives for enrolling in the L2A MOOC

You will be asked to answer a series of questions on your motives for enrolling in the Learn2Analyze (L2A) MOOC.

Number of questions in current section: 6

1. Which of the following best describes your goal in taking this course? Please select one of the following
   - Planning to follow the course schedule and complete all activities to earn a certificate of completion
   - Auditing, but intend to follow the course schedule
   - Auditing, but do not intend to follow the course schedule
   - Just checking what this course is about
   - Bookmaking it as a learning resource
   - Interested in a small subset of course topics
   - General curiosity
   - Other

2. Can you tell us why you have enrolled in this course?
   Please select the number [1..5] that best describes what you think.

	Not at all true	2	Somewhat true	4	Very True	Not Applicable
M1. Participating in this course is relevant for my personal development.						
M2. Participating in this course will extend my current knowledge of the topic.						
M3. I will use this course to obtain a job relevant						

qualification.						
M4. I think the L2A certificate is beneficial for my CV and future job applications.						
M5. The subject of the course is relevant to my academic field of study.						
M6. The subject of the course is relevant to my college/university class						
M7. I have been advised or ordered to take part in this course.						
M8. I have enrolled in this course out of general curiosity.						

3. How confident are you in your ability to learn the material in this course?
   - Not confident at all
   - A little confident
   - Moderately confident
   - Very confident
   - Extremely confident

4. How would you rate your possibility of finishing this course according to the anticipated time commitment as defined in the syllabus?
   (On a scale from 1 (least likely) to 5 (most likely), please rate your opinion)

5. How many hours per week do you plan to spend studying on this course?
   - less than 3 hours
   - 3-4 hours
   - 5-6 hours
   - 7-8 hours
   - More than 8 hours

6. What is the percentage of the course you intend to complete?
   - 0%-20%
   - 21%-40%
   - 41%-60%
   - 61%-80%
   - 81%-100%

7. Do you target Certificate Level A (core EDL competences), Certificate Level B (advanced EDL competences) or both?
   - Certificate Level A
   - Certificate Level B
   - Both
   - None

8. How would you describe yourself?
   Please select the choice that best describes what you think.

	Very much like me	Mostly like me	Somewhat like me	Not much like me	Not like me at all
GRIT1. New ideas and projects sometimes distract me from previous ones.					
GRIT2. Setbacks don't discourage me					
GRIT3. I have been obsessed with a certain idea or project for a short time but later lost interest.					
GRIT4. I am a hard worker.					
GRIT5. I often set a goal but later choose to pursue a different one					
GRIT6. I have difficulty maintaining my focus on projects that take more than a few months to complete					
GRIT7. I finish whatever I begin.					
GRIT8. I am diligent.					

Section 7 - Existing Competence Level per L2A EDL-CP Statement

Dimension 1: Data Collection

1.1 Obtain, access and gather the appropriate data and/or data sources

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

1.2 Apply data limitations and quality measures (e.g., validity, reliability, biases in the data, difficulty in collection, accuracy, completeness)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Dimension 2: Data Management

2.1 Apply data processing and handling methods (i.e., methods for cleaning and changing data to make it more organized – e.g., duplication, data structuring)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

2.2 Apply data description (i.e., metadata)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

2.3 Apply data curation processes (i.e., to ensure that data is reliably retrievable for future reuse, and to determine what data is worth saving and for how long)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

2.4 Apply the technologies to preserve data (i.e., store, persist, maintain, backup data), e.g., storage mediums/services, tools, mechanisms

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Dimension 3: Data Analysis

3.1 Apply data analysis and modelling methods (e.g. application of descriptive statistics, exploratory data analysis, data mining)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

3.2 Apply data presentation methods (e.g., pictorial visualisation of the data by using graphs, charts, maps and other data forms like textual or tabular representations)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Dimension 4: Data Comprehension & Interpretation

4.1 Interpret data properties (e.g., measurement error, outliers, discrepancies within data, key take-away points, data dependencies)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

4.2 Interpret statistics commonly used with educational data (e.g., randomness, central tendencies, mean, standard deviation, significance)

- Novice
- Advanced beginner
- Competent

- Proficient
- Expert

4.3 Interpret insights from data analysis (e.g., explanations of patterns, identification of hypotheses, connection of multiple observations, underlying trends)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

4.4 Elicit potential implications/links of the data analysis insights to instruction

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Dimension 5: Data Application

5.1 Use data analysis results to make decisions to revise instruction

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

5.2 Evaluate the data-driven revision of instruction

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Dimension 6: Data Ethics

6.1 Use the informed consent

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

6.2 Protect individuals' data privacy, confidentiality, integrity and security

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

6.3 Apply authorship, ownership, data access (governance), re-negotiation and datasharing

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Section 8 – Instructions to unlock the L2A MOOC content

Thank you for your participation.

Submit the form and get access to the Learn2Analyze MOOC.

Please provide your email address to receive an email with the Learn2Analyze MOOC Unlock Code.

After the course opening (1st of March 2021), you can return to the Learn2Analyze MOOC (https://learn2analyze.imc-learning.de) and use this code as a key to unlock the Learn2Analyze MOOC content.

What is your Email address?

Enter the email address you used when you made your OpenCourseWorld account.

_____

Appendix A.2 – Post-course Survey

Section 1 – Invitation

You are invited to participate in this survey because you have registered for the online course administered by Learn2Analyze Consortium. Your responses to this survey will help us to evaluate the Learn2Analyze MOOC and improve it in future versions.

The Post-Course Survey is expected to take approximately 30 minutes to complete and it is a requirement for the Certificate of Achievement.

In the Post-Course Survey you will be asked questions about your level of satisfaction and learning experience per module, as well as the overall learning experience of the Learn2Analyze (L2A) MOOC. Furthermore, you will be requested to answer questions about your overall gamification experience and the experience per gamification element. Finally, you will report on your achieved competence level per "Educational Data Literacy (EDL) Competence Profile (CP) Statement" for each competence dimension of the Learn2Analyze EDL Competence framework, after attending the Learn2Analyze (L2A) MOOC.

Submit the form and get the key to unlock the Level A and/or Level B Learn2Analyze Certificate of Achievement. Return to the https://learn2analyze.imc-learning.de platform and use this key to download your certificate.

We greatly appreciate your willingness to share your time by participating. Your responses to this survey will help us to improve the quality of the learning experience and to better our course offerings, acknowledging your insights will prove invaluable.

Section 2 – Consent form to participate in Web-based Survey

Title of Survey: Learn2Analyze MOOC Post-course Survey Questionnaire

Purpose and Procedure:
The Learn2Analyze (L2A) is an Academia-Industry Knowledge Alliance for enhancing Online Training Professionals' (Instructional Designers and e-Trainers) Competences in Educational Data Analytics. L2A is an action co-funded by the European Commission through the Erasmus+ Program of the European Union (Cooperation for innovation and the exchange of good practices - Knowledge Alliances, Agreement n. 2017-2733 / 001-001, Project No 588067-EPP-1-2017-1-EL-EPPKA2-KA).
More information about the project is available at www.learn2analyze.eu.

Please note:
1. The survey will be carried out from 01/03/2021 to 06/06/2021.
2. Before you proceed to the survey questions, you will be asked to indicate your consent.
3. Should you decide you do not wish to further participate, you may leave the survey at any time, just by exiting your browser.

4. The questionnaire consists of 8 sections and needs approximately 30 minutes to be completed.
5. In the first section, you are invited to participate in the post-course survey.
6. The second section includes the consent form for participating in the survey.
7. The third section includes a set of questions on your level of satisfaction and learning experience per module of the Learn2Analyze (L2A) MOOC.
8. The fourth section includes a set of questions on your overall level of satisfaction and learning experience after attending the Learn2Analyze (L2A) MOOC.
9. The fifth section includes a set of questions on your overall gamification experience after attending the Learn2Analyze (L2A) MOOC.
10. The sixth section includes a set of questions on your experience per every implemented gamification element after attending the Learn2Analyze (L2A) MOOC.
10. The seventh section includes a set of questions on your competence level per "Educational Data Literacy (EDL) Competence Profile (CP) Statement" for each competence dimension of the Learn2Analyze EDL Competence framework, after attending the Learn2Analyze (L2A) MOOC.
11. In the final section, you will be asked for your name and email address in order to receive a key to unlock the Learn2Analyze Certificate of Achievement. Return to the https://learn2analyze.imc-learning.de platform and use this key to download your Level A and/or Level B Certificate.

Legal basis for processing personal and sensitive data:
Personal Data:
In connection with this research, the Learn2Analyze Consortium's collection and processing of the following Personal Data is lawful based on consent (Article 6.1(a), GDPR):
□ Name, Email Address
□ Education Information
Sensitive Data:
In connection with this research, the Learn2Analyze Consortium's collection and processing of the following Sensitive Data is lawful based on consent (Article 9.2(a), GDPR):
□ Gender

Potential Benefits:
There are no direct benefits for participating in the survey. The survey results will help us evaluate the L2A MOOC and improve its future versions.

Potential Risk or Discomforts:
We do not perceive of any risk or discomfort in the completion of the survey.

Storage of Data:
The survey is completed in a Google Docs form and stored in a secure GoogleDrive folder under the e-mail l2a.r12.survey@gmail.com, for the time required by the purposes described in this document, for maximum 2 years.

Data transfer outside the European Union:

We may share some of the data collected with services located outside the European Union, in particular through the aforementioned Google services. The transfer is authorized on the basis of provisions of the European Union, on the adequacy of the protection offered by the EU-US privacy shield scheme.

Right to Withdraw:
Your participation in this survey is voluntary. You are under no obligation to complete the survey and you can withdraw from the survey prior to submitting it. If you do not want to participate simply stop participating or close the browser window. You can simply exit the Web Browser without saving your responses, and they will not be recorded.

Rights of research participants:
You have the right to request access to, a copy of, rectification, restriction in the use of, or erasure of your information in accordance with all applicable laws, contacting the lead Learn2Analyze researcher for this survey in l2a.r12.survey@gmail.com. The erasure of your information shall be subject to the Learn2Analyze Consortium's need to retain certain information pursuant to any other identified lawful basis.
If the Learn2Analyze Consortium's use of your information is pursuant to your consent, you have the right to withdraw consent without affecting the lawfulness of the Learn2Analyze Consortium's use of the information prior to receipt of your request.
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Participant Concerns and Reporting:
If you have any questions concerning the survey or experience any discomfort related to the survey, please contact the lead Learn2Analyze researcher for this survey in l2a.r12.survey@gmail.com

Conflict of Interest:
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Compensation:
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Confidentiality:
The only people processing your input will be the researcher(s) involved in the Learn2Analyze project. The researcher(s) undertake to keep any information provided herein confidential, not to let it out of our possession and to report on the findings from the perspective of the entire participating group and not from the perspective of an individual. Please note that confidentiality cannot be guaranteed while data are in transit over the Internet.

How will results be used:

The results of the survey will be used for evaluating the L2A MOOC. The results from the survey may be used for research study, for scholarly purposes only and might be presented in conferences, published in journals or articles for educational purposes.
By indicating consent to participate in this survey you also indicate consent for the possible secondary use of this data at a later date if we decide to undertake a further longitudinal study for the enhancement of the Learn2Analyze MOOC.

Debriefing and Dissemination of Results:
The final report will be made publicly available through the official website of the project www.learn2analyze.eu.
On behalf of the Learn2Analyze Consortium, we would like to sincerely thank you for your participation in our survey acknowledging that your insights on the questions in this survey will prove invaluable.

Selecting "I Agree" below indicates that:

You have read the above information;
You voluntarily agree to participate in this survey;
You understand the procedures described above;
You give consent for the use of your Personal Data for the purposes outlined in this notice;
You give consent for the use of your Sensitive Data for the purposes outlined in this notice;
You are at least 18 years of age.

Do you consent?

- o I Agree

Section 3 - Create you Unique Code ID

To create your unique code ID please use:
1. The first letter of your first name (e.g. U)
2. The last 2 digits of your cell phone (if none use 00) (e.g. 17)
3. Your month of birth (e.g. 03)
4. The first letter of your middle name (if none, use X) (e.g. M)
5. The first letter of city/town you were born in (e.g. V)

(The above example would generate the unique code ID: U1703MV)

Please provide your unique code ID as per instructions:

_____

Section 4 - Learning experience per module

Number of questions in current section: 13

1. Learning objectives per module were clearly stated.
2. The content per module was presented in a comprehensible manner.
3. The educational materials and content per module were relevant and addressed the topic identified in the title.
4. The educational materials and content per module were based on current up-to-date information.
5. The instructional videos per module supported my learning and added value to the course content.
6. The graphics per module supported my learning and added value to the course content.
7. There was a good variety of content types (i.e., written notes, videos, graphics, etc.).
8. Further Readings per module were relevant and supported my learning.
9. Learning activities (Polls, Discussions and Workshops) used in the module were effective and helped me construct explanations/solutions.
10. Assessment tasks (quiz learning activities) used per module challenged my thinking and supported my learning.
11. The assessment tasks (quiz learning activities) per module were relevant to the learning objectives.

for question 1 to 11	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Module 2 Online and Blended Teaching and Learning supported by Educational Data					
Module 3 Learning Analytics					
Module 4 Teaching Analytics					
Module 5 Applying Teaching & Learning Analytics with Moodle					
Module 6 Applying Teaching & Learning Analytics with eXact Suite					
Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite					

12. How many hours per week did you spend on each module?

	< 3 h	3 – 4 h	5 – 6 h	7 – 8 h	> 8 h
Module 2 Online and Blended Teaching and Learning supported by Educational Data					
Module 3 Learning Analytics					
Module 4 Teaching Analytics					
Module 5 Applying Teaching & Learning Analytics with Moodle					
Module 6 Applying Teaching & Learning Analytics with eXact Suite					
Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite					

13. How many posts did you contribute to discussion forums per module?

	None	1 -2 posts	3 – 4 posts	> 5 posts
Module 2 Online and Blended Teaching and Learning supported by Educational Data				
Module 3 Learning Analytics				
Module 4 Teaching Analytics				
Module 5 Applying Teaching & Learning Analytics with Moodle				
Module 6 Applying Teaching & Learning Analytics with eXact Suite				
Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite				

Section 5 – Overall learning experience

Number of questions in current section: 25

Please rate [1..5] your agreement to the following statements:
Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree

1. The course platform was easy to use.
2. The overall visual design of the course was appealing.
3. The course environment was well structured, topics and subtopics were logically arranged in a predictable pattern.
4. The learning path was easy to navigate.
5. Course objectives and learning goals were clearly stated.

6. The workload was reasonably spread.
7. The workload was in line with my expectations.
8. The course difficulty was in line with my expectations at the start of the course.
9. The difficulty level of assessment tasks (quiz learning activities) was appropriate for the course.
10. The level of interaction with peer learners was adequate.
11. The discussion forums were an effective tool for collaborating with other learners.
12. Final Assessment for the Level A Certificate required the learner to have acquired a basic set of competences for EDL.
13. The difficulty level of assessments was appropriate for the Level A Certificate.
14. Assessment for the Level B Certificate required demonstration of a higher expertise in EDL.
15. Assessment for the Level B Certificate included hands-on assignments based on simulated practice scenarios.
16. The difficulty level of assessments was appropriate for the Level B Certificate.
17. Help and support provided on the course platform were adequate.
18. I can apply the knowledge created in this course to my work or other related activities.
19. I was motivated to work through the course.
20. I feel like I achieved my personal goals for this course.
21. I enjoyed the course.
22. It is very likely to revisit the course materials in the future.
23. It is very likely to recommend this course e.g. to a colleague or friend.

24. What did you enjoy most about your course experience?

_____

25. What did you like least about taking part in the course?

_____

Section 6 – Overall Gamification Experience

Number of questions in current section: 4

Please rate [1..5] your agreement to the following statements:
Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree

1. Satisfaction, Enjoyment and Motivation of Gamification Experience

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1.1 I found the experience of the course enjoyable.					
1.2 I found the course stimulating.					
1.3 I enjoyed the gamified elements in the course so much that I was motivated to be retained.					
1.4 I found the experience of the course interesting.					
1.5 My interest on EDL has increased during the course.					
1.6 It was a pleasure to work through such well-designed gamified course.					
1.7 Gamification elements encouraged me to participate in the course.					
1.8 I feel competent on EDL after completing the course.					
1.9 The course provided me with interesting options and choices.					
1.10 I feel very capable and effective on EDL after completing the course.					
1.11 I experienced a high level of freedom in the course.					
1.12 My ability to be retain in the course is well matched with the course's challenges.					
1.13 The course allows me to do useful activities related to EDL practice.					

2. During the course, the gamification elements:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
2.1 Made me feel that success comes through accomplishments.					
2.2 Made me feel like someone is keeping me on track.					
2.3 Gave me the feeling that I was not on my own.					
2.4 Made me feel guided.					

2.5 Gave me a sense of knowing what I needed to do to do better.					
2.6 Gave me a sense of having someone to share my endeavors with.					
2.7 Gave me the feeling that I need to reach goals.					
2.8 Gave me a sense of being noticed for what I have achieved.					
2.9 Felt like participating in a competition.					
2.10 Pressured me in a positive way by its high demands.					
2.11 Made me want to be in first place.					
2.12 Challenged me.					
2.13 Made me feel that I needed to be on top to succeed.					
2.14 Motivated me to do things that felt highly demanding.					

3. During the course I felt that:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
3.1 Using gamification elements helped me to improve my performance.					
3.2 Using gamification elements helped me to increase my productivity.					
3.3 Using gamification elements made me feel more effective reaching learning goals.					
3.4 Having gamification elements was useful.					

4. My attitude towards gamification is favorable.
   On a scale from 1 (not at all true) to 5 (very true)

Section 7 – Gamification Experience per Element

Number of questions in current section: 5

Please rate [1..5] your agreement to the following statements:
Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, Strongly Agree

1. How would you describe your experience with the gamification element "Points"?
2. How would you describe your experience with the gamification element "Badges"?
3. How would you describe your experience with the gamification element "Levels"?
4. How would you describe your experience with the gamification element "Progress Bar"?
5. How would you describe your experience with the gamification element "Leaderboard"?

for question 1 to 5	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I found it enjoyable.					
I found it motivating.					
It made me feel competent on EDL.					
It made me to participate and work in the course.					
It made me feel that my ability to be retain in the course was well matched with the course's challenges.					
It helped me feel very capable and effective on EDL.					
It made it easier for me to set clear goals.					
It made me feel guided.					
It helped me to improve my performance.					
Having it in the course was useful.					

Section 8 – Achieved Competence Level per L2A EDL-CP Statement

Please rate your achieved competence level for each statement of the L2A Educational Data Literacy Competence Dimensions addressed in this course

You can find additional information about L2A EDL-CP in http://www.learn2analyze.eu/

Dimension 1: Data Collection

1.1 Obtain, access and gather the appropriate data and/or data sources

- Novice
- Advanced beginner
- Competent
- Proficient

- Expert

1.2 Apply data limitations and quality measures (e.g., validity, reliability, biases in the data, difficulty in collection, accuracy, completeness)
- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Dimension 2: Data Management

2.1 Apply data processing and handling methods (i.e., methods for cleaning and changing data to make it more organized – e.g., duplication, data structuring)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

2.2 Apply data description (i.e., metadata)
- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

2.3 Apply data curation processes (i.e., to ensure that data is reliably retrievable for future reuse, and to determine what data is worth saving and for how long)
- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

2.4 Apply the technologies to preserve data (i.e., store, persist, maintain, backup data), e.g., storage mediums/services, tools, mechanisms
- Novice
- Advanced beginner
- Competent

- Proficient
- Expert

Dimension 3: Data Analysis

3.1 Apply data analysis and modelling methods (e.g. application of descriptive statistics, exploratory data analysis, data mining)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

3.2 Apply data presentation methods (e.g., pictorial visualisation of the data by using graphs, charts, maps and other data forms like textual or tabular representations)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Dimension 4: Data Comprehension & Interpretation

4.1 Interpret data properties (e.g., measurement error, outliers, discrepancies within data, key take-away points, data dependencies)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

4.2 Interpret statistics commonly used with educational data (e.g., randomness, central tendencies, mean, standard deviation, significance)

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

4.3 Interpret insights from data analysis (e.g., explanations of patterns, identification of hypotheses, connection of multiple observations, underlying trends)

- Novice

- Advanced beginner
- Competent
- Proficient
- Expert

4.4 Elicit potential implications/links of the data analysis insights to instruction

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Dimension 5: Data Application

5.1 Use data analysis results to make decisions to revise instruction

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

5.2 Evaluate the data-driven revision of instruction

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Dimension 6: Data Ethics

6.1 Use the informed consent

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

6.2 Protect individuals' data privacy, confidentiality, integrity and security

- Novice
- Advanced beginner
- Competent
- Proficient

- Expert

6.3 Apply authorship, ownership, data access (governance), re-negotiation and datasharing

- Novice
- Advanced beginner
- Competent
- Proficient
- Expert

Section 9 – Certificate

Congratulations, you have reached the end of our trip. You have successfully completed the L2A MOOC and submitted the Pre- and Post-Course Surveys. Thank you for your participation.

Please provide your name, surname and email address in order to receive a personalized Certificate of Achievement of the Learn2Analyze MOOC. Submit the form and get the key to unlocking the Learn2Analyze Certificate of Achievement. Return to the https://learn2analyze.imc-learning.de platform and use this key to download your Level A and/or Level B Certificate.

What is your email address?

_____

Name

_____

Surname

_____

Appendix A.3 – Coding / Groups of professional roles

A. eLearning Professionals (IDs, eTutors)
1. Professional Instructional Designer and/or (e-) Tutor of Online and/or Blended Courses
2. Professional involved in supporting Teaching & Learning in Higher Education and/or Professional involved in supporting Professional Development

B. Higher Education Students
1. Higher Education Students

C. School Teachers
1. K12 Teachers

D. Experts with Experience in EDL
1. Academic involved in teaching Higher Education Courses specifically for Educational Data Literacy Researchers in Digital Learning and/or Learning Technologies
2. Researcher in Educational Data Literacy
3. Professional involved in supporting Educational Data in Higher Education and/or Professional Development

E. Managers in (Online) Education/Training
1. Senior Manager in a Higher Education Institute
2. Senior Manager in a Professional Development Service Provider
3. Senior Manager in an e-Learning Service Provider
4. Senior Manager in a Governmental Education Policy Making Institute

F. Academics/Researchers in ID and/or Online Education/Training
1. Academic involved in teaching Higher Education Courses on Digital Learning and/or Learning Technologies
2. Academic involved in teaching Higher Education Courses specifically for Instructional Designers and/or e-Tutors
3. Researcher in Instructional Design of Online and/or Blended Courses

Appendix B.1 – Profiles of participants who enrolled in the course

B1.1. General

a. Gender

Table 24: Distribution of participants per gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	820	65.7	65.7	65.7
	Male	410	32.8	32.8	98.5
	Gay	1	0.1	0.1	98.6
	I prefer not to answer	18	1.4	1.4	100.0
	Total	1249	100.0	100.0	

b. Country of residence

Table 25: Country of residence

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Algeria	1	.1	.1	.1
	Armenia	1	.1	.1	.2
	Australia	5	.4	.4	.6
	Austria	7	.6	.6	1.1
	Belgium	4	.3	.3	1.4
	Bosnia and Herzegovina	2	.2	.2	1.6
	Brazil	3	.2	.2	1.8
	Bulgaria	1	.1	.1	1.9
	Cabo Verde	1	.1	.1	2.0
	Canada	7	.6	.6	2.6
	China	3	.2	.2	2.8
	Colombia	2	.2	.2	3.0
	Croatia	8	.6	.6	3.6
	Cyprus	3	.2	.2	3.8
	Czechia (Czech Republic)	1	.1	.1	3.9
	Denmark	2	.2	.2	4.1
	Egypt	2	.2	.2	4.2
	Estonia	1	.1	.1	4.3
	Eswatini (fmr. "Swaziland)	1	.1	.1	4.4
	Fiji	2	.2	.2	4.6
	Finland	3	.2	.2	4.8
	France	20	1.6	1.6	6.4
	Germany	164	13.1	13.1	19.5
	Greece	750	60.0	60.0	79.6
	Grenada	1	.1	.1	79.7
	Hungary	2	.2	.2	79.8
	India	10	.8	.8	80.6
	Indonesia	1	.1	.1	80.7
	Iran	1	.1	.1	80.8
	Ireland	27	2.2	2.2	82.9
	Italy	91	7.3	7.3	90.2
	Jamaica	1	.1	.1	90.3
	Jordan	1	.1	.1	90.4
	Kazakhstan	1	.1	.1	90.5
	Kenya	1	.1	.1	90.6
	Kuwait	4	.3	.3	90.9
	Lebanon	1	.1	.1	91.0
	Mexico	1	.1	.1	91.0
	Morocco	3	.2	.2	91.3
	Netherlands	6	.5	.5	91.8

	New Zealand	3	.2	.2	92.0
	Nigeria	1	.1	.1	92.1
	Norway	5	.4	.4	92.5
	Pakistan	1	.1	.1	92.6
	Palestine State	1	.1	.1	92.6
	Poland	1	.1	.1	92.7
	Portugal	2	.2	.2	92.9
	Qatar	1	.1	.1	93.0
	Romania	4	.3	.3	93.3
	Russia	2	.2	.2	93.4
	Rwanda	1	.1	.1	93.5
	Saudi Arabia	1	.1	.1	93.6
	Singapore	4	.3	.3	93.9
	Slovakia	2	.2	.2	94.1
	Slovenia	1	.1	.1	94.2
	South Africa	1	.1	.1	94.2
	Spain	7	.6	.6	94.8
	Sudan	1	.1	.1	94.9
	Switzerland	14	1.1	1.1	96.0
	Syria	1	.1	.1	96.1
	Tunisia	1	.1	.1	96.2
	Turkey	3	.2	.2	96.4
	Ukraine	1	.1	.1	96.5
	United Arab Emirates	2	.2	.2	96.6
	United Kingdom	21	1.7	1.7	98.3
	United States of America	16	1.3	1.3	99.6
	Vietnam	3	.2	.2	99.8
	Yemen	2	.2	.2	100.0
	Total	1249	100.0	100.0	

c. Background knowledge

Table 26: Educational background

Education level				
	Frequency	Percent	Valid Percent	Cumulative Percent
Master's Degree (e.g., MA, MS, MSc, MEng, MEd, MSW, MBA)	705	56.4	56.4	56.4
Bachelor's degree (e.g., BSc, BA, AB, BS, BPS)	234	18.7	18.7	75.2
Doctoral Degree (e.g., PhD, EdD)	145	11.6	11.6	86.8
High School Diploma (or equivalent)	94	7.5	7.5	94.3
Associate degree - academic program	29	2.3	2.3	96.6
Professional School Degree (e.g., JD, MD, DDS, DVM, LLB)	13	1.0	1.0	97.7
Associate degree / technical diploma - occupational / technical / vocational program	12	1.0	1.0	98.6
Other	17	1.4	1.4	100.0
Total	1249	100.0	100.0	

Table 27: English Proficiency (On a scale from 1 (low) to 5 (high), Mean=3.99, St.Dev=0.915)

English Proficiency					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	10	.8	.8	.8
	2	53	4.2	4.2	5.0
	3	312	25.0	25.0	30.0
	4	442	35.4	35.4	65.4
	5	432	34.6	34.6	100.0
	Total	1249	100.0	100.0	

Table 28: Comfort with technology (On a scale from 1 (low) to 5 (high), Mean=4.18, St.Dev=0.799)

Comfort with Technology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	.1	.1	.1
	2	28	2.2	2.2	2.3
	3	215	17.2	17.2	19.5
	4	502	40.2	40.2	59.7
	5	503	40.3	40.3	100.0
	Total	1249	100.0	100.0	

Table 29: Enrolment in MOOCs (Mean=3.53)

MOOCs enrolled

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	369	29.5	29.5	29.5
	1	192	15.4	15.4	44.9
	2-4	361	28.9	28.9	73.8
	5-10	186	14.9	14.9	88.7
	>10	141	11.3	11.3	100.0
	Total	1249	100.0	100.0	

Table 30: MOOC Completions (Mean=2.98)

MOOCs completed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	478	38.3	38.3	38.3
	1	164	13.1	13.1	51.4
	2-4	331	26.5	26.5	77.9
	5-10	170	13.6	13.6	91.5
	>10	106	8.5	8.5	100.0
	Total	1249	100.0	100.0	

Table 31: MOOCs enrolled * MOOCs completed Crosstabulation

			MOOCs completed					
			None	1	2-4	5-10	>10	Total
MOOCs enrolled	None	Count	364	0	2	3	0	369
		% within MOOCs enrolled	98.6%	0.0%	0.5%	0.8%	0.0%	100.0%
		% within MOOCs completed	76.2%	0.0%	0.6%	1.8%	0.0%	29.5%
		% of Total	29.1%	0.0%	0.2%	0.2%	0.0%	29.5%
	1	Count	80	106	6	0	0	192
		% within MOOCs enrolled	41.7%	55.2%	3.1%	0.0%	0.0%	100.0%
		% within MOOCs completed	16.7%	64.6%	1.8%	0.0%	0.0%	15.4%
		% of Total	6.4%	8.5%	0.5%	0.0%	0.0%	15.4%
	2-4	Count	30	48	278	4	1	361
		% within MOOCs enrolled	8.3%	13.3%	77.0%	1.1%	0.3%	100.0%
		% within MOOCs completed	6.3%	29.3%	84.0%	2.4%	0.9%	28.9%
		% of Total	2.4%	3.8%	22.3%	0.3%	0.1%	28.9%
	5-10	Count	3	9	41	133	0	186
		% within MOOCs enrolled	1.6%	4.8%	22.0%	71.5%	0.0%	100.0%
		% within MOOCs completed	0.6%	5.5%	12.4%	78.2%	0.0%	14.9%
		% of Total	0.2%	0.7%	3.3%	10.6%	0.0%	14.9%
	>10	Count	1	1	4	30	105	141
		% within MOOCs enrolled	0.7%	0.7%	2.8%	21.3%	74.5%	100.0%
		% within MOOCs completed	0.2%	0.6%	1.2%	17.6%	99.1%	11.3%
		% of Total	0.1%	0.1%	0.3%	2.4%	8.4%	11.3%
Total		Count	478	164	331	170	106	1249
		% within MOOCs enrolled	38.3%	13.1%	26.5%	13.6%	8.5%	100.0%
		% within MOOCs completed	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	38.3%	13.1%	26.5%	13.6%	8.5%	100.0%

d. Professional experience

Table 32: Job Sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	K-12 Education	578	46.3	46.3	46.3
	University	227	18.2	18.2	64.5
	Governmental Education Agency	95	7.6	7.6	72.1
	Self-employed	66	5.3	5.3	77.3
	Large (>100 people) for-profit company	59	4.7	4.7	82.1
	Not-employed	56	4.5	4.5	86.5
	Small (<100 people) for-profit company	47	3.8	3.8	90.3
	College	40	3.2	3.2	93.5
	Small (<100 people) non-profit	19	1.5	1.5	95.0
	Large (>100 people) non-profit	16	1.3	1.3	96.3
	Other Governmental Agency	14	1.1	1.1	97.4
	Other	32	2.6	2.6	100.0
	Total	1249	100.0	100.0	

*Job Sector Groups: 845 (67.7%) K-12, University, or College; 141 (11.3%) Industry (Small/Large – for/non-profit); 122 (9.8%) Self/Not-employed; 141 (11.3%) Other

Table 33: Job role: (After coding the responses – See Appendix A.3)

Professional Role

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	School Teacher	622	49.8	49.8	49.8
	eLearning Professional	212	17.0	17.0	66.8
	Higher Education Student	146	11.7	11.7	78.5
	Academic/Researcher in ID and/or Online Education/Training	74	5.9	5.9	84.4
	Other	70	5.6	5.6	90
	Expert with Experience in EDL	69	5.5	5.5	95.5
	Manager in (Online) Education/Training	56	4.5	4.5	100
	Total	1249	100.0	100.0	

Table 34: Years in job role (Mean=12.26)

Years in role

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5	420	33.6	33.6	33.6
	6-10	143	11.4	11.4	45.1
	11-20	459	36.7	36.7	81.8
	21+	227	18.2	18.2	100.0
	Total	1249	100.0	100.0	

Table 35: Years in Digital Teaching and Learning (Mean=6.96)

Years in Digital Educ.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5	731	58.5	58.5	58.5
	6-10	266	21.3	21.3	79.8
	11-20	206	16.5	16.5	96.3
	21+	46	3.7	3.7	100.0
	Total	1249	100.0	100.0	

Table 36: Years in role per professional roles (groups)

Experience ProfRolesGroups	Mean	N	Std. Deviation
eLearning Professional	8.1179	212	6.71334
Higher Education Student	4.9863	146	5.04222
Other	8.8736	269	6.86890
School Teacher	16.8344	622	6.94091
Total	12.2554	1249	8.16595

Table 37: Participants' professional roles in relation to their experience in the role (Crosstabulation)

			Professional Role							
			eLearning Professional	Higher Education Student	School Teacher	Academic/ Researcher in ID and/or Online Education/ Training	Expert with Experience in EDL	Manager in (Online) Education/ Training	Other	Total
Years in role	1-5	Count	110	119	64	30	37	25	35	420
		% of Total	8.8%	9.5%	5.1%	2.4%	3.0%	2.0%	2.8%	33.6%
	6-10	Count	44	13	36	16	11	14	9	143
		% of Total	3.5%	1.0%	2.9%	1.3%	0.9%	1.1%	0.7%	11.4%
	11-20	Count	44	9	332	22	16	15	21	459
		% of Total	3.5%	0.7%	26.6%	1.8%	1.3%	1.2%	1.7%	36.7%
		Count	14	5	190	6	5	2	5	227
		% of Total	1.1%	0.4%	15.2%	0.5%	0.4%	0.2%	0.4%	18.2%
Total		Count	212	146	622	74	69	56	70	1249
		% of Total	17.0%	11.7%	49.8%	5.9%	5.5%	4.5%	5.6%	100.0%

B1.2. Motivation: Goals, Reasons for enrolment, Self-confidence, Time commitment, Time allocation, GRIT

a. Goals

Table 38: Goal in taking this course

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Planning to follow the course schedule and complete all activities to earn a certificate of completion	841	67.3	67.3	67.3
	Auditing, but intend to follow the course schedule	98	7.8	7.8	75.2
	General curiosity	90	7.2	7.2	82.4
	Bookmaking it as a learning resource	58	4.6	4.6	87.0
	Just checking what this course is about	58	4.6	4.6	91.7
	Interested in a small subset of course topics	44	3.5	3.5	95.2
	Auditing, but do not intend to follow the course schedule	37	3.0	3.0	98.2
	Other	23	1.8	1.8	100.0
	Total	1249	100.0	100.0	

b. Enrolment reasons

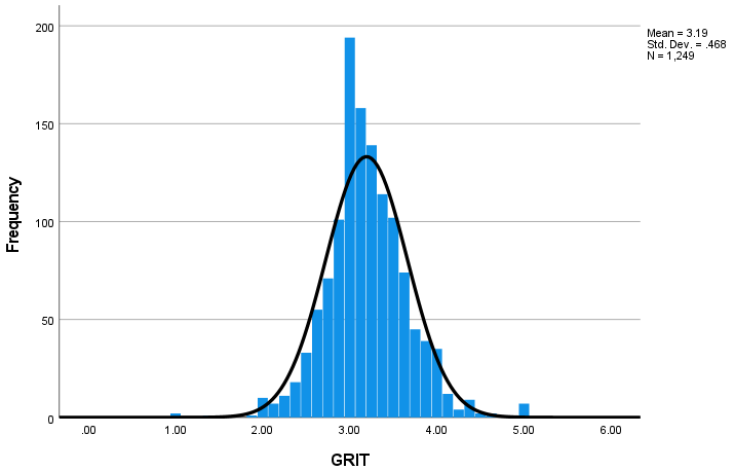
Table 39: Reasons for enrolment

	Average	Not At All True	2	Somewhat True	4	Very True	Not Applicable
Participating in this course is relevant for my personal development.	4.25	9	47	210	222	737	24
I will use this course to obtain a job-relevant qualification.	3.14	163	214	278	205	335	54
Participating in this course will extend my current knowledge of the topic.	4.38	1	18	104	185	876	65
I think the L2A certificate is beneficial for my CV and future job applications.	3.45	95	157	274	227	434	62
The subject of the course is relevant to my academic field of study.	3.42	96	112	238	247	450	106
The subject of the course is relevant to my college/university class.	2.67	205	142	232	197	272	201
I have enrolled in this course out of general curiosity.	2.96	160	183	280	231	282	113
I have been advised or ordered to take part in this course.	1.84	676	143	130	81	125	94

c. GRIT

Table 40: GRIT Descriptive Statistics (Mean=3.19, St.Dev.=0.468)

	N	Minimum	Maximum	Mean	Std. Deviation
GRIT1	1249	1.00	5.00	2.8247	1.10383
GRIT2	1249	1.00	5.00	3.4684	1.02101
GRIT3	1249	1.00	5.00	2.4948	1.00807
GRIT4	1249	1.00	5.00	4.1361	.97930
GRIT5	1249	1.00	5.00	2.4163	1.02200
GRIT6	1249	1.00	5.00	2.3627	1.09219
GRIT7	1249	1.00	5.00	3.8551	1.02874
GRIT8	1249	1.00	5.00	3.9840	.99746
Valid N)	1249				



d. Self-Confidence

Table 41: Confidence to learn material (Mean=3.53)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not confident at all	25	2.0	2.0	2.0
	A little confident	103	8.2	8.2	10.2
	Moderately confident	440	35.2	35.2	45.5
	Very confident	542	43.4	43.4	88.9
	Extremely confident	139	11.1	11.1	100.0
	Total	1249	100.0	100.0	

e. Time commitment

Table 42: Time commitment in course (Mean=3.76, St.Dev.=0.873)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	17	1.4	1.4	1.4
	2	60	4.8	4.8	6.2
	3	377	30.2	30.2	36.3
	4	544	43.6	43.6	79.9
	5	251	20.1	20.1	100.0
	Total	1249	100.0	100.0	

f. Time allocation

Table 43: Time allocation (Mean=4.23)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 3 hours	256	20.5	20.5	20.5
	3-4 hours	488	39.1	39.1	59.6
	5-6 hours	293	23.5	23.5	83.0
	7-8 hours	133	10.6	10.6	93.7
	more than 8 hours	79	6.3	6.3	100.0
	Total	1249	100.0	100.0	

B1.3. EDL Intro Competence

Table 44: Initial EDL Competences level per dimension

Statistics

		D1: Data collection	D2: Data Management	D3: Data Analysis	D4: Data Comprehension and Interpretation	D5: Data Application	D6: Data Ethics
N	Valid	1249	1249	1249	1249	1249	1249
	Missing	0	0	0	0	0	0
Mean		2.19	2.00	2.05	1.90	1.88	2.05
Std. Deviation		1.01	0.93	0.96	0.93	0.91	0.99
Percentiles	25	1.00	1.00	1.00	1.00	1.00	1.00
	50	2.00	2.00	2.00	1.75	2.00	2.00
	75	3.00	2.75	3.00	2.50	2.50	2.66

Table 45: Statistics for EDL Statement

		D1S1	D1S2	D2S1	D2S2	D2S3	D2S4
N	Valid	1249	1249	1249	1249	1249	1249
	Missing	0	0	0	0	0	0
Mean		2.3066	2.0809	2.0464	1.9215	1.8847	2.1465
Std. Deviation		1.09103	1.01938	1.02348	0.99289	0.96385	1.05543
		D3S1	D3S2	D4S1	D4S2	D4S3	D4S4
N	Valid	1249	1249	1249	1249	1249	1249
	Missing	0	0	0	0	0	0
Mean		1.8959	2.2066	1.8775	1.9736	1.9287	1.8375
Std. Deviation		0.97668	1.06920	0.98313	1.05160	0.99786	0.94987
		D5S1	D5S2	D6S1	D6S2	D6S3	
N	Valid	1249	1249	1249	1249	1249	
	Missing	0	0	0	0	0	
Mean		1.9239	1.8303	2.0833	2.1689	1.9015	
Std. Deviation		0.94130	0.94395	1.06343	1.08728	1.01309	

B1.4. Gamification Experience: Gamification attitude, gamification type

Table 46: Gamification attitude (Mean=3.99 →True Favorable)

My attitude towards gamification is favorable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all true	26	2.1	2.1	2.1
	2	44	3.5	3.5	5.6
	Somewhat true	295	23.6	23.6	29.2
	4	285	22.8	22.8	52.0
	Very true	569	45.6	45.6	97.6
	Not Applicable	30	2.4	2.4	100.0
	Total	1249	100.0	100.0	

Table 47: Gamification User Type (personality)

Descriptive Statistics of gamification user types

	N	Minimum	Maximum	Mean	Std. Deviation
Achiever	1249	4.00	28.00	22.5204	4.11549
Philanthropist	1249	4.00	28.00	23.5460	3.93228
Socializer	1249	4.00	28.00	21.7102	4.75599
FreeSpirit	1249	4.00	28.00	22.3891	3.83482
Player	1249	4.00	28.00	18.8719	4.80930
Disruptor	1249	4.00	28.00	14.9680	4.90067
Valid N (listwise)	1249				

Statistics per statement of gamification user type

	Interacting with others is important to me.	It makes me happy if I am able to help others.	It is important to me to follow my own path.	I like being part of a team.	I like to provoke.	I like competitions where a prize can be won.	It is important to me to feel like I am part of a community.	I often let my curiosity guide me.
N Valid	1249	1249	1249	1249	1249	1249	1249	1249
Missing	0	0	0	0	0	0	0	0
Mean	5.54	6.03	5.36	5.54	3.48	4.35	5.51	5.42
Std. Deviation	1.400	1.160	1.339	1.282	1.851	1.628	1.324	1.338

	I like to question the status quo.	Rewards are a great way to motivate me.	I like to try new things.	I like defeating obstacles.	I like helping others to orient themselves in new situations.	I see myself as a rebel.	I enjoy group activities.	It is important to me to always carry out my tasks completely.
N Valid	1249	1249	1249	1249	1249	1249	1249	1249
Missing	0	0	0	0	0	0	0	0
Mean	4.89	4.72	5.97	5.71	5.77	3.62	5.12	5.79
Std. Deviation	1.470	1.528	1.130	1.261	1.163	1.702	1.477	1.218

	I dislike following rules.	I like sharing my knowledge	It is difficult for me to let go of a problem before I have found a solution.	Return of investment is important to me.	Being independent is important to me.	I like mastering difficult tasks.	The well-being of others is important to me.	If the reward is sufficient I will put in the effort.
N Valid	1249	1249	1249	1249	1249	1249	1249	1249
Missing	0	0	0	0	0	0	0	0
Mean	2.98	5.95	5.43	5.06	5.63	5.59	5.80	4.74
Std. Deviation	1.551	1.122	1.344	1.360	1.279	1.225	1.164	1.541

B1.5. Target completion

Table 48: What is the percentage of the course you intend to complete?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0%-20%	8	.6	.6	.6
	21%-40%	21	1.7	1.7	2.3
	41%-60%	90	7.2	7.2	9.5
	61%-80%	239	19.1	19.1	28.7
	81%-100%	891	71.3	71.3	100.0
	Total	1249	100.0	100.0	

B1.6. Target certificate

Table 49: Do you target Certificate Level A (core EDL competences), Certificate Level B (advanced EDL competences) or both?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Both	855	68.5	68.5	68.5
	Certificate Level A	253	20.3	20.3	88.7
	Certificate Level B	46	3.7	3.7	92.4
	None	95	7.6	7.6	100.0
	Total	1249	100.0	100.0	

Appendix B.2 – Profiles of participants who enrolled in the course per targeted group

B2.1. Professional experience

Difference in mean **Professional Experience** between the targeted groups (in years)

a. Statistical significance of **Difference in Professional experience** between the groups

Table 50: ANOVA - Difference in Professional experience between targeted groups

Experience

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	27461.855	3	9153.952	204.395	.000
Within Groups	55758.171	1245	44.786		
Total	83220.026	1248			

b. Difference in professional experience between pairs of targeted groups

Table 51: Professional experience - Independent Samples Test: eLearning Professionals and Higher Education Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Experience	Equal variances assumed	24.863	.000	4.783	356	.000	3.13162	.65478	1.84391	4.41934
	Equal variances not assumed			5.036	353.296	.000	3.13162	.62187	1.90858	4.35466

Table 52: Professional experience - Independent Samples Test: Higher Education Students and School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Experience	Equal variances assumed	26.156	.000	-19.452	766	.000	-11.84810	.60910	-13.04381	-10.6524
	Equal variances not assumed			-23.621	289.310	.000	-11.84810	.50159	-12.83533	-10.8608

Table 53: Professional experience - Independent Samples Test: eLearning Professionals and School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Experience	Equal variances assumed	.036	.850	-15.922	832	.000	-8.71648	.54746	-9.79105	-7.64191
	Equal variances not assumed			-16.185	375.808	.000	-8.71648	.53856	-9.77544	-7.65752

Difference in mean **Experience in Ed Tech (Ed Tech Background in years)** between the targeted groups

c. Statistical significance of **Difference in experience in Ed Tech** between the groups

Table 54: ANOVA - Difference in Difference in experience in Ed Tech between targeted groups

Experience Ed Tech

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1645.440	3	548.480	16.679	.000
Within Groups	40941.050	1245	32.884		
Total	42586.489	1248			

d. Difference in experience in Ed Tech between pairs of targeted groups

Table 55: Experience in Ed Tech - Independent Samples Test: eLearning Professionals and Higher Education Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Experience Ed Tech	Equal variances assumed	95.510	.000	7.308	356	.000	4.14077	.56661	3.02644	5.25509
	Equal variances not assumed			8.341	300.786	.000	4.14077	.49644	3.16383	5.11770

Table 56: Experience in Ed Tech - Independent Samples Test: Higher Education Students and School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Experience Ed Tech	Equal variances assumed	93.107	.000	-6.282	766	.000	-3.19005	.50782	-4.18694	-2.19316
	Equal variances not assumed			-9.784	523.150	.000	-3.19005	.32606	-3.83060	-2.54951

Table 57: Experience in Ed Tech - Independent Samples Test: eLearning Professionals and School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Experience Ed Tech	Equal variances assumed	1.933	.165	1.953	832	.050	.95071	.48690	-.00498	1.90641
	Equal variances not assumed			1.880	342.325	.061	.95071	.50573	-.04402	1.94545

B2.2. Motivation

a. Difference in **Goals in taking the course** between the targeted groups

Table 58: Frequencies of Goal in taking this course per targeted group

		eLearning Professionals	Higher Education Students	School Teachers	Total
		Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Valid	Planning to follow the course schedule and complete all activities to earn a certificate of completion	120 (56.6%)	104 (71.2%)	450 (72.3%)	674 (68.8%)
	Auditing, but intend to follow the course schedule	18 (8.5%)	9 (6.2%)	44 (7.1%)	71 (7.2%)
	General curiosity	21 (9.9%)	7 (4.8%)	41 (6.6%)	69 (7.0%)
	Bookmaking it as a learning resource	10 (4.7%)	4 (2.7%)	36 (5.8%)	50 (5.1%)
	Just checking what this course is about	13 (6.1%)	10 (6.8%)	23 (3.7%)	46 (4.7%)
	Interested in a small subset of course topics	12 (5.7%)	6 (4.1%)	11 (1.8%)	29 (3.0%)
	Auditing, but do not intend to follow the course schedule	14 (6.6%)	2 (1.4%)	5 (0.8%)	21 (2.1%)
	Other	4 (1.9%)	4 (2.7%)	12 (1.9%)	20 (2.0%)
	Total	212 (100.0%)	146 (100.0%)	622 (100.0%)	980 (100.0%)

b. Difference in **Enrolment Reasons (M1-M8**) between the targeted groups

Table 59: Mean per reason for enrolment per targeted group

ProfRolesGroups		M1	M2	M3	M4	M5	M6	M7	M8
eLearning Professional	Mean	**4.24**	**4.36**	3.14	3.28	3.17	2.33	1.75	3.08
	N	212	212	212	212	212	212	212	212
	Std. Deviation	1.06	1.22	1.50	1.55	1.75	1.83	1.48	1.66
Higher Education Student	Mean	**3.82**	**4.08**	3.51	3.75	**3.83**	3.25	2.71	2.73
	N	146	146	146	146	146	146	146	146
	Std. Deviation	1.25	1.21	1.43	1.41	1.52	1.93	1.71	1.56
School Teacher	Mean	**4.33**	**4.47**	3.06	3.43	3.33	2.64	1.69	2.91
	N	622	622	622	622	622	622	622	622
	Std. Deviation	1.07	1.28	1.53	1.48	1.56	1.65	1.28	1.56
Other	Mean	4.29	4.45	3.11	3.47	3.60	2.68	1.78	3.11
	N	269	269	269	269	269	269	269	269
	Std. Deviation	1.09	1.17	1.54	1.54	1.65	1.84	1.46	1.66
Total	Mean	4.25	4.38	3.14	3.45	3.42	2.67	1.84	2.96
	N	1249	1249	1249	1249	1249	1249	1249	1249
	Std. Deviation	1.10	1.24	1.52	1.50	1.62	1.77	1.44	1.60

i. Statistical significance of **Difference in means of reasons for enrolment** between the groups

a. **Table 60**: ANOVA - Difference in reasons for enrolment between targeted groups

		Sum of Squares	df	Mean Square	F	Sig.
M1	Between Groups	31.056	2	15.528	**12.944**	**.000**
	Within Groups	1172.021	977	1.200		
	Total	1203.078	979			
M2	Between Groups	14.543	2	7.272	**4.616**	**.010**
	Within Groups	1539.024	977	1.575		
	Total	1553.567	979			
M3	Between Groups	24.228	2	12.114	**5.341**	**.005**
	Within Groups	2215.906	977	2.268		
	Total	2240.134	979			
M4	Between Groups	19.965	2	9.983	**4.532**	**.011**
	Within Groups	2151.948	977	2.203		
	Total	2171.913	979			
M5	Between Groups	39.845	2	19.922	**7.808**	**.000**
	Within Groups	2492.697	977	2.551		
	Total	2532.542	979			

M6	Between Groups	74.096	2	37.048	**12.343**	**.000**
	Within Groups	2932.454	977	3.001		
	Total	3006.550	979			
M7	Between Groups	127.370	2	63.685	**32.727**	**.000**
	Within Groups	1901.198	977	1.946		
	Total	2028.567	979			
M8	Between Groups	11.321	2	5.660	2.266	.104
	Within Groups	2440.471	977	2.498		
	Total	2451.792	979			

ii. Difference in **means of reasons for enrolment** between pairs of targeted groups

Table 61: Reasons for enrolment - Independent Samples Test: eLearning Professionals – School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
M1	Equal variances assumed	.532	.466	-1.163	832	.245	-.09856	.08474	-.26489	.06778
	Equal variances not assumed			-1.165	366.148	.245	-.09856	.08458	-.26488	.06777
M2	Equal variances assumed	.199	.656	-.673	832	.501	-.06755	.10043	-.26468	.12957
	Equal variances not assumed			-.687	379.522	.492	-.06755	.09827	-.26077	.12566
M3	Equal variances assumed	.129	.719	.665	832	.506	.08042	.12086	-.15680	.31764
	Equal variances not assumed			.672	371.896	.502	.08042	.11958	-.15472	.31555
M4	Equal variances assumed	.697	.404	-1.255	832	.210	-.14935	.11900	-.38292	.08422
	Equal variances not assumed			-1.226	350.669	.221	-.14935	.12180	-.38891	.09021
M5	Equal variances assumed	4.325	.038	-1.211	832	.226	-.15505	.12808	-.40645	.09634
	Equal variances not assumed			-1.144	332.432	.253	-.15505	.13552	-.42165	.11154
M6	Equal variances assumed	**9.581**	**.002**	**-2.249**	832	**.025**	-.30336	.13487	-.56808	-.03863
	Equal variances not assumed			-2.134	334.374	**.034**	-.30336	.14217	-.58303	-.02369
M7	Equal variances assumed	11.090	.001	.524	832	.601	.05547	.10592	-.15243	.26336
	Equal variances not assumed			.487	324.085	.627	.05547	.11396	-.16873	.27966
M8	Equal variances assumed	.649	.421	1.388	832	.165	.17494	.12603	-.07244	.42231
	Equal variances not assumed			1.348	347.163	.179	.17494	.12978	-.08032	.43020

Table 62: Reasons for enrolment - Independent Samples Test: eLearning Professionals – Higher Education Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
M1	Equal variances assumed	**5.638**	**.018**	**3.366**	356	**.001**	.41393	.12299	.17205	.65581
	Equal variances not assumed			3.266	277.546	**.001**	.41393	.12675	.16442	.66344
M2	Equal variances assumed	**.031**	**.860**	**2.164**	356	**.031**	.28315	.13084	.02583	.54047
	Equal variances not assumed			2.168	313.786	**.031**	.28315	.13061	.02617	.54013
M3	Equal variances assumed	**.934**	**.334**	**-2.359**	356	**.019**	-.37219	.15778	-.68249	-.06189

	Equal variances not assumed			-2.380	321.301	**.018**	-.37219	.15638	-.67986	-.06452
M4	Equal variances assumed	**4.876**	**.028**	**-2.955**	356	**.003**	-.47512	.16079	-.79133	-.15891
	Equal variances not assumed			-3.006	329.486	**.003**	-.47512	.15806	-.78605	-.16419
M5	Equal variances assumed	**8.305**	**.004**	**-3.664**	356	**.000**	-.65424	.17855	-1.00539	-.30309
	Equal variances not assumed			-3.761	337.473	**.000**	-.65424	.17397	-.99644	-.31204
M6	Equal variances assumed	**.043**	**.835**	**-4.560**	356	**.000**	-.91852	.20143	-1.31466	-.52237
	Equal variances not assumed			-4.517	301.358	**.000**	-.91852	.20333	-1.31865	-.51838
M7	Equal variances assumed	**12.338**	**.001**	**-5.702**	356	**.000**	-.96918	.16997	-1.30346	-.63490
	Equal variances not assumed			-5.553	281.667	**.000**	-.96918	.17454	-1.31276	-.62560
M8	Equal variances assumed	**.748**	**.388**	**2.065**	356	**.040**	.35888	.17378	.01711	.70064
	Equal variances not assumed			2.089	323.954	**.037**	.35888	.17180	.02090	.69686

Table 63: Reasons for enrolment - Independent Samples Test: School Teachers – Higher Education Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
M1	Equal variances assumed	**10.748**	**.001**	**5.047**	766	**.000**	.51249	.10154	.31316	.71181
	Equal variances not assumed			4.571	197.253	**.000**	.51249	.11211	.29140	.73358
M2	Equal variances assumed	**.325**	**.569**	**3.017**	766	**.003**	.35070	.11626	.12248	.57893
	Equal variances not assumed			3.119	227.105	**.002**	.35070	.11244	.12915	.57226
M3	Equal variances assumed	**1.987**	**.159**	**-3.262**	766	**.001**	-.45261	.13877	-.72501	-.18020
	Equal variances not assumed			-3.406	229.894	**.001**	-.45261	.13290	-.71447	-.19074
M4	Equal variances assumed	**4.091**	**.043**	**-2.417**	766	**.016**	-.32577	.13478	-.59035	-.06119
	Equal variances not assumed			-2.486	225.659	**.014**	-.32577	.13103	-.58397	-.06758
M5	Equal variances assumed	**3.896**	**.049**	**-3.496**	766	**.000**	-.49919	.14277	-.77945	-.21892
	Equal variances not assumed			-3.554	222.470	**.000**	-.49919	.14044	-.77595	-.22242
M6	Equal variances assumed	**8.025**	**.005**	**-3.926**	766	**.000**	-.61516	.15667	-.92272	-.30761
	Equal variances not assumed			-3.561	197.481	**.000**	-.61516	.17277	-.95587	-.27445
M7	Equal variances assumed	**52.217**	**.000**	**-8.134**	766	**.000**	-1.02464	.12598	-1.27195	-.77734
	Equal variances not assumed			-6.798	184.534	**.000**	-1.02464	.15073	-1.32201	-.72728
M8	Equal variances assumed	.137	.712	1.283	766	.200	.18394	.14338	-.09752	.46540
	Equal variances not assumed			1.285	218.640	.200	.18394	.14316	-.09820	.46608

iii. Mean values of **intrinsic/extrinsic/total motivation** per targeted group

Table 64: Mean per Intrinsic/Extrinsic/Total motivation per targeted group

ProfRolesGroups		IntMotivation	ExtMotivation	Motivation
eLearning Professional	Mean	3.4377	2.7233	3.1698
	N	212	212	212

	Std. Deviation	.86976	1.10861	.75858
Higher Education Student	Mean	3.5411	3.3288	3.4615
	N	146	146	146
	Std. Deviation	.95590	.99191	.82532
School Teacher	Mean	3.5277	2.7278	3.2277
	N	622	622	622
	Std. Deviation	.84027	1.05113	.79017
Other	Mean	3.6283	2.7881	3.3132
	N	269	269	269
	Std. Deviation	.88677	1.15080	.83822
Total	Mean	3.5356	2.8102	3.2636
	N	1249	1249	1249
	Std. Deviation	.87050	1.09202	.80327

iv. Statistical significance of **intrinsic/extrinsic/total motivation** between the groups

Table 65: ANOVA - Difference in Intrinsic/Extrinsic/Total motivation between targeted groups

		Sum of Squares	df	Mean Square	F	Sig.
IntMotivation	Between Groups	4.383	3	1.461	1.932	.122
	Within Groups	941.321	1245	.756		
	Total	945.705	1248			
ExtMotivation	Between Groups	45.222	3	15.074	**13.005**	**.000**
	Within Groups	1443.029	1245	1.159		
	Total	1488.251	1248			
Motivation	Between Groups	9.045	3	3.015	**4.714**	**.003**
	Within Groups	796.224	1245	.640		
	Total	805.269	1248			

c. Difference in **GRIT Score** between the targeted groups

Table 66: Mean per GRIT dimension per targeted group

ProfRolesGroups		GRIT1	GRIT2	GRIT3	GRIT4	GRIT5	GRIT6	GRIT7	GRIT8	GRIT
eLearning Professional	Mean	3.01	3.44	2.61	4.07	2.63	2.54	3.66	3.86	3.23
	N	212	212	212	212	212	212	212	212	212
	Std. Deviation	1.044	.984	.945	.929	1.019	1.099	.944	.983	.463
Higher Education Student	Mean	3.07	3.32	2.78	3.90	2.66	2.71	3.71	3.73	3.24
	N	146	146	146	146	146	146	146	146	146
	Std. Deviation	.930	.946	.979	.978	.979	1.011	1.030	.992	.481
School Teacher	Mean	2.60	3.54	2.32	4.19	2.22	2.20	4.01	4.11	3.15
	N	622	622	622	622	622	622	622	622	622
	Std. Deviation	1.107	1.039	.988	1.003	.997	1.066	1.043	.966	.449
Other	Mean	3.06	3.40	2.64	4.18	2.58	2.42	3.74	3.92	3.24
	N	269	269	269	269	269	269	269	269	269
	Std. Deviation	1.131	1.038	1.051	.946	1.018	1.123	1.012	1.044	.499
Total	Mean	2.82	3.47	2.49	4.14	2.42	2.36	3.86	3.98	3.19
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249
	Std. Deviation	1.104	1.021	1.008	.979	1.022	1.092	1.029	.997	.468

Statistical significance of **Difference in GRIT Scores** between the groups

Table 67: ANOVA - Difference in GRIT Score per dimension between targeted groups

		Sum of Squares	df	Mean Square	F	Sig.
GRIT1	Between Groups	61.341	3	20.447	**17.445**	**.000**
	Within Groups	1459.259	1245	1.172		
	Total	1520.600	1248			
GRIT2	Between Groups	7.876	3	2.625	2.527	.056
	Within Groups	1293.125	1245	1.039		
	Total	1301.001	1248			
GRIT3	Between Groups	38.526	3	12.842	**13.002**	**.000**
	Within Groups	1229.690	1245	.988		
	Total	1268.216	1248			
GRIT4	Between Groups	11.342	3	3.781	**3.970**	**.008**

	Within Groups	1185.519	1245	.952		
	Total	1196.861	1248			
GRIT5	Between Groups	49.941	3	16.647	**16.533**	**.000**
	Within Groups	1253.566	1245	1.007		
	Total	1303.507	1248			
GRIT6	Between Groups	41.909	3	13.970	**12.021**	**.000**
	Within Groups	1446.792	1245	1.162		
	Total	1488.701	1248			
GRIT7	Between Groups	29.769	3	9.923	**9.569**	**.000**
	Within Groups	1291.001	1245	1.037		
	Total	1320.770	1248			
GRIT8	Between Groups	24.247	3	8.082	**8.265**	**.000**
	Within Groups	1217.433	1245	.978		
	Total	1241.680	1248			
GRIT	Between Groups	2.322	3	.774	**3.561**	**.014**
	Within Groups	270.585	1245	.217		
	Total	272.907	1248			

d. Difference in **Confidence, Time commitment and Time allocation** between the targeted groups

Table 68: Mean per self-confidence factor per targeted group

ProfRolesGroups		Confidence to learn material	Time commitment in course	Time allocation
eLearning Professional	Mean	3.6274	3.56	4.2736
	N	212	212	212
	Std. Deviation	.89644	.939	2.26359
Higher Education Student	Mean	3.3014	3.60	4.2808
	N	146	146	146
	Std. Deviation	.89727	.936	2.18298
School Teacher	Mean	3.4405	3.88	4.4550
	N	622	622	622
	Std. Deviation	.84680	.813	2.15530
Total	Mean	3.4602	3.77	4.3898
	N	980	980	980
	Std. Deviation	.87026	.872	2.18269

Statistical significance of **Confidence, Time commitment and Time allocation** between the groups

Table 69: ANOVA - Difference in Self-confidence factors between targeted groups

		Sum of Squares	df	Mean Square	F	Sig.
Confidence to learn material	Between Groups	9.848	2	4.924	**6.576**	**.001**
	Within Groups	731.600	977	.749		
	Total	741.448	979			
Time commitment in course	Between Groups	20.544	2	10.272	**13.864**	**.000**
	Within Groups	723.876	977	.741		
	Total	744.419	979			
Time allocation	Between Groups	7.240	2	3.620	.759	.468
	Within Groups	4656.858	977	4.766		
	Total	4664.098	979			

B2.3. Initial EDL Competence level

Difference in **Initial EDL competence level** per targeted group

Table 70: Mean per EDL Statement and EDL Dimension per targeted group

	eLearning Professional			Higher Education Student			School Teacher			Other			Total		
	Mean	N	Std. Deviation	Mean	N	Std. Deviation	Mean	N	Std. Deviation	Mean	N	Std. Deviation	Mean	N	Std. Deviation
D1S1	2.27	212	1.131	2.10	146	0.999	2.23	622	1.061	2.62	269	1.119	2.31	1249	1.091

D1S2	1.96	212	0.994	1.96	146	0.916	2.04	622	0.980	2.35	269	1.134	2.08	1249	1.019
D2S1	2.00	212	1.014	1.91	146	0.924	1.99	622	1.014	2.28	269	1.073	2.05	1249	1.023
D2S2	1.91	212	1.024	1.80	146	0.944	1.84	622	0.955	2.17	269	1.042	1.92	1249	0.993
D2S3	1.80	212	0.938	1.73	146	0.859	1.86	622	0.962	2.09	269	1.015	1.88	1249	0.964
D2S4	2.05	212	1.057	1.95	146	0.967	2.17	622	1.052	2.28	269	1.090	2.15	1249	1.055
D3S1	1.84	212	0.975	1.82	146	0.868	1.80	622	0.923	2.20	269	1.094	1.90	1249	0.977
D3S2	2.22	212	1.153	2.08	146	0.940	2.11	622	1.031	2.48	269	1.108	2.21	1249	1.069
D4S1	1.87	212	0.977	1.82	146	0.863	1.76	622	0.926	2.20	269	1.104	1.88	1249	0.983
D4S2	1.92	212	1.057	1.95	146	0.967	1.88	622	1.016	2.25	269	1.128	1.97	1249	1.052
D4S3	1.95	212	1.027	1.88	146	0.901	1.81	622	0.952	2.21	269	1.074	1.93	1249	0.998
D4S4	1.80	212	0.938	1.74	146	0.847	1.73	622	0.894	2.16	269	1.063	1.84	1249	0.950
D5S1	1.98	212	0.934	1.81	146	0.866	1.81	622	0.885	2.21	269	1.048	1.92	1249	0.941
D5S2	1.83	212	0.910	1.73	146	0.835	1.75	622	0.911	2.07	269	1.059	1.83	1249	0.944
D6S1	2.14	212	1.122	1.93	146	0.973	1.95	622	0.987	2.43	269	1.152	2.08	1249	1.063
D6S2	2.17	212	1.107	1.96	146	0.989	2.08	622	1.046	2.49	269	1.154	2.17	1249	1.087
D6S3	1.83	212	0.978	1.77	146	0.932	1.85	622	0.991	2.14	269	1.095	1.90	1249	1.013
D1	2.11	212	1.002	2.03	146	0.900	2.14	622	0.991	2.48	269	1.058	2.19	1249	1.008
D2	1.94	212	0.922	1.85	146	0.833	1.97	622	0.921	2.21	269	0.968	2.00	1249	0.928
D3	2.03	212	0.994	1.95	146	0.846	1.96	622	0.912	2.34	269	1.040	2.05	1249	0.959
D4	1.89	212	0.918	1.84	146	0.824	1.79	622	0.884	2.21	269	1.021	1.90	1249	0.928
D5	1.90	212	0.878	1.77	146	0.822	1.78	622	0.875	2.14	269	1.025	1.88	1249	0.915
D6	2.05	212	0.998	1.89	146	0.897	1.96	622	0.947	2.35	269	1.061	2.05	1249	0.988

a. Statistical significance of differences in **Initial EDL Competence level per EDL Dimension** between the groups

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
D1	Between Groups	1.371	2	.685	.713	.490
	Within Groups	938.829	977	.961		
	Total	940.200	979			
D2	Between Groups	1.740	2	.870	1.054	.349
	Within Groups	806.310	977	.825		
	Total	808.050	979			
D3	Between Groups	.942	2	.471	.555	.574
	Within Groups	828.536	977	.848		
	Total	829.478	979			
D4	Between Groups	1.410	2	.705	.904	.405
	Within Groups	761.965	977	.780		
	Total	763.375	979			
D5	Between Groups	2.606	2	1.303	1.728	.178
	Within Groups	736.614	977	.754		
	Total	739.219	979			
D6	Between Groups	2.404	2	1.202	1.329	.265
	Within Groups	883.616	977	.904		
	Total	886.019	979			

b. Difference in Initial EDL Competence level between **pairs of targeted groups**

Table 71: Initial EDL Competence - Independent Samples Test: eLearning Professionals and Higher Education Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
D1	Equal variances assumed	1.173	.280	.830	356	.407	.08581	.10342	-.11757	.28919

	Equal variances not assumed			.846	331.99	.398	.08581	.10139	-.11363	.28526
D2	Equal variances assumed	.901	.343	.973	356	.331	.09279	.09538	-.09478	.28036
	Equal variances not assumed			.991	331.09	.322	.09279	.09360	-.09133	.27691
D3	Equal variances assumed	3.935	.048	.814	356	.416	.08203	.10075	-.11611	.28017
	Equal variances not assumed			.839	340.33	.402	.08203	.09782	-.11037	.27444
D4	Equal variances assumed	.583	.445	.437	356	.662	.04144	.09473	-.14486	.22773
	Equal variances not assumed			.446	331.96	.656	.04144	.09287	-.14126	.22413
D5	Equal variances assumed	.007	.935	1.479	356	.140	.13618	.09206	-.04487	.31723
	Equal variances not assumed			1.497	324.61	.135	.13618	.09095	-.04275	.31510
D6	Equal variances assumed	1.412	.236	1.581	356	.115	.16290	.10304	-.03975	.36555
	Equal variances not assumed			1.612	332.00	.108	.16290	.10102	-.03583	.36162

Table 72: Initial EDL Competence - Independent Samples Test: eLearning Professionals and School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
D1	Equal variances assumed	.293	.589	-.276	832	.782	-.02184	.07902	-.17695	.13326
	Equal variances not assumed			-.275	361.48	.784	-.02184	.07945	-.17809	.13441
D2	Equal variances assumed	.891	.346	-.387	832	.699	-.02836	.07325	-.17213	.11541
	Equal variances not assumed			-.387	364.39	.699	-.02836	.07331	-.17253	.11580
D3	Equal variances assumed	1.183	.277	.987	832	.324	.07326	.07422	-.07242	.21895
	Equal variances not assumed			.946	339.79	.345	.07326	.07745	-.07908	.22561
D4	Equal variances assumed	.251	.616	1.287	832	.198	.09140	.07102	-.04799	.23079
	Equal variances not assumed			1.264	353.73	.207	.09140	.07231	-.05082	.23362
D5	Equal variances assumed	1.384	.240	1.750	832	.080	.12195	.06967	-.01480	.25870
	Equal variances not assumed			1.747	363.86	.081	.12195	.06979	-.01529	.25919
D6	Equal variances assumed	.794	.373	1.158	832	.247	.08840	.07636	-.06149	.23828
	Equal variances not assumed			1.128	349.10	.260	.08840	.07837	-.06574	.24254

Table 73: Initial EDL Competence - Independent Samples Test: Higher Education Students – School Teacher

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
D1	Equal variances assumed	3.298	.070	-1.202	766	.230	-.10765	.08959	-.28353	.06823
	Equal variances not assumed			-1.275	234.85	.203	-.10765	.08440	-.27393	.05863

D2	Equal variances assumed	4.114	.043	-1.456	766	.146	-.12115	.08319	-.28446	.04216
	Equal variances not assumed			-1.550	235.62	.123	-.12115	.07818	-.27516	.03286
D3	Equal variances assumed	2.365	.124	-.106	766	.916	-.00877	.08273	-.17118	.15365
	Equal variances not assumed			-.111	230.74	.912	-.00877	.07901	-.16444	.14691
D4	Equal variances assumed	2.077	.150	.622	766	.534	.04997	.08032	-.10770	.20764
	Equal variances not assumed			.650	230.04	.516	.04997	.07688	-.10152	.20145
D5	Equal variances assumed	1.375	.241	-.179	766	.858	-.01423	.07960	-.17048	.14203
	Equal variances not assumed			-.186	228.57	.853	-.01423	.07658	-.16512	.13667
D6	Equal variances assumed	.383	.536	-.864	766	.388	-.07450	.08622	-.24376	.09476
	Equal variances not assumed			-.894	227.24	.372	-.07450	.08335	-.23873	.08973

B2.4 Gamification profiles

a. Difference in **Gamification Attitude** per targeted group

Table 74: Mean of Attitude towards Gamification per targeted group

GamificationAttitude

ProfRolesGroups	Mean	N	Std. Deviation
eLearning Professional	4.2129	202	.89177
Higher Education Student	3.7174	138	.94358
Other	4.1373	255	.93530
School Teacher	4.2458	598	.89186
Total	4.1559	1193	.92095

Statistical significance of differences in **Gamification Attitude** between the groups

Table 75: ANOVA - Difference in Attitude towards Gamification between targeted groups

GamificationAttitude

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	32.003	2	16.001	19.772	.000
Within Groups	756.689	935	.809		
Total	788.692	937			

b. Gamification User Types

Table 76: Gamification User Type: School Teachers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Achiever**	**78**	**12.5**	12.5	12.5
	Disruptor	3	.5	.5	13.0
	FreeSpirit	61	9.8	9.8	22.8
	multitype	**242**	**38.9**	38.9	61.7
	Philanthropist	**157**	**25.2**	25.2	87.0
	Player	14	2.3	2.3	89.2
	Socializer	67	10.8	10.8	100.0
	Total	622	100.0	100.0	

Table 77: Gamification User Type: eLearning Professionals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Achiever	25	11.8	11.8	11.8
	Disruptor	1	.5	.5	12.3
	FreeSpirit	**40**	**18.9**	18.9	31.1
	multitype	**83**	**39.2**	39.2	70.3
	Philanthropist	**45**	**21.2**	21.2	91.5
	Player	3	1.4	1.4	92.9
	Socializer	15	7.1	7.1	100.0
	Total	212	100.0	100.0	

Table 78: GamificationUserType: Higher Education Students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Achiever	8	5.5	5.5	5.5
	Disruptor	4	2.7	2.7	8.2
	FreeSpirit	10	6.8	6.8	15.1
	multitype	**46**	**31.5**	31.5	46.6
	Philanthropist	**42**	**28.8**	28.8	75.3
	Player	7	4.8	4.8	80.1
	Socializer	**29**	**19.9**	19.9	100.0
	Total	146	100.0	100.0	

Appendix B.3 - Profiles of participants who completed the course and per targeted group

B3.1. General

a) Age

Statistical difference in mean age between “completers” and “droppers”

Table 79: Group Statistics - Age

	Completion	N	Mean	Std. Deviation	Std. Error Mean
age	No	963	43.37	10.223	.330
	Yes	286	40.99	11.794	.695

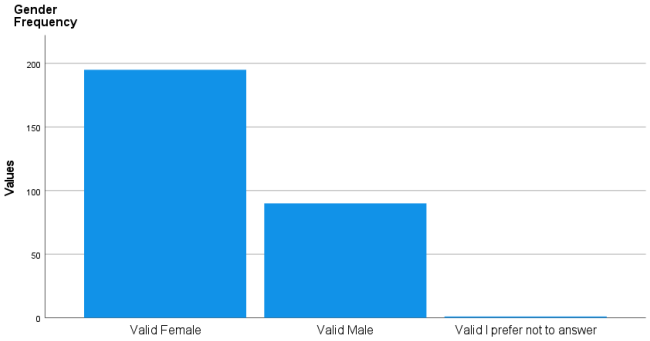
Table 80: Independent Samples Test: Completers - Droppers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
age	Equal variances assumed	13.625	.000	3.316	1247	.001	2.363	.713	.965	3.762
	Equal variances not assumed			3.073	422.816	.002	2.363	.769	.852	3.875

b) Gender: (Completion rates) Female: 23.78%; Male: 21.95%, Prefer not to answer: 5.56%

Table 81: Gender of participants who completed the course

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	195	68.2	68.2	68.2
	Male	90	31.5	31.5	99.7
	I prefer not to answer	1	0.3	0.3	100.0
	Total	286	100.0	100.0	



c) Country of residence

Table 82: Country of residence (Geographical distribution) of participants who completed the course

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Algeria	1	.3	.3	.3
	Australia	1	.3	.3	.7
	Austria	2	.7	.7	1.4
	Colombia	1	.3	.3	1.7
	Croatia	3	1.0	1.0	2.8
	Denmark	1	.3	.3	3.1
	France	1	.3	.3	3.5
	Germany	67	23.4	23.4	26.9
	Greece	185	64.7	64.7	91.6
	India	1	.3	.3	92.0
	Indonesia	1	.3	.3	92.3
	Iran	1	.3	.3	92.7
	Ireland	6	2.1	2.1	94.8
	Italy	5	1.7	1.7	96.5
	Kuwait	1	.3	.3	96.9
	Qatar	1	.3	.3	97.2
	Singapore	1	.3	.3	97.6
	Switzerland	3	1.0	1.0	98.6
	United Kingdom	2	.7	.7	99.3
	United States of Ameri	2	.7	.7	100.0
	Total	286	100.0	100.0	

d) Age, Gender, Geographical Distribution, and Experience (in professional role and in digital teaching and learning) per targeted group

a) School Teaches

Table 83: Descriptive statistics of Gender for School Teachers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	116	70.7	70.7	70.7
	Male	48	29.3	29.3	100.0
	Total	164	100.0	100.0	

Table 84: Descriptive statistics of Country of residence for School Teachers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Croatia	3	1.8	1.8	1.8
	Denmark	1	.6	.6	2.4
	Germany	2	1.2	1.2	3.7
	Greece	156	95.1	95.1	98.8

	India	1	.6	.6	99.4
	Italy	1	.6	.6	100.0
	Total	164	100.0	100.0	

Table 85: Descriptive statistics of age, experience in prof. role, experience in digital ed. for School Teachers

	N	Minimum	Maximum	Mean	Std. Deviation
age	164	26	61	45.99	7.478
Experience in prof. role	164	3.00	25.50	17.1006	6.95564
Experience Ed Tech	164	3.00	25.50	7.6341	6.58384
Valid N (listwise)	164				

b) eLearning Professionals

Table 86: Descriptive statistics of Gender for eLearning Professionals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	13	50.0	50.0	50.0
	Male	13	50.0	50.0	100.0
	Total	26	100.0	100.0	

Table 87: Descriptive statistics of Country of residence for eLearning Professionals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	France	1	3.8	3.8	3.8
	Germany	7	26.9	26.9	30.8
	Greece	7	26.9	26.9	57.7
	Indonesia	1	3.8	3.8	61.5
	Ireland	4	15.4	15.4	76.9
	Italy	2	7.7	7.7	84.6
	Singapore	1	3.8	3.8	88.5
	Switzerland	1	3.8	3.8	92.3
	United Kingdom	1	3.8	3.8	96.2
	United States of Ameri	1	3.8	3.8	100.0
	Total	26	100.0	100.0	

Table 88: Descriptive statistics of age, experience in prof. role, experience in digital ed. for eLearning Professionals

	N	Minimum	Maximum	Mean	Std. Deviation
age	26	25	74	43.73	12.151
Experience in prof. role	26	3.0	25.5	7.327	6.7660
ExperienceEDTech	26	3.0	25.5	7.519	6.7089
Valid N (listwise)	26				

c) Higher Education Students

Table 89: Descriptive statistics of Gender for Higher Education Students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	42	73.7	73.7	73.7
	Male	15	26.3	26.3	100.0
	Total	57	100.0	100.0	

Table 90: Descriptive statistics of Country of residence for Higher Education Students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Germany	50	87.7	87.7	87.7
	Greece	7	12.3	12.3	100.0
	Total	57	100.0	100.0	

Table 91: Descriptive statistics of age, experience in prof. role, experience in digital ed. for eLearning Professionals

	N	Minimum	Maximum	Mean	Std. Deviation
age	57	20	47	24.16	4.836
Experience in prof. role	57	3.00	15.50	3.3070	1.77219
Experience Ed Tech	57	3.00	8.00	3.1754	.92819
Valid N (listwise)	57				

Educational background: (Completion rates) Master's Degree: 21.28%; Bachelor's Degree: 19.23%; Doctoral Degree: 17.93%; High School Diploma: 54.25%

Table 92: Education level of Participants who completed the course

	Frequency	Percent	Valid Percent	Cumulative Percent
Master's Degree (e.g., MA, MS, MSc, MEng, MEd, MSW, MBA)	150	52.4	52.4	52.4
High School Diploma (or equivalent)	51	17.8	17.8	70.3
Bachelor's degree (e.g., BSc, BA, AB, BS, BPS)	45	15.7	15.7	86.0
Doctoral Degree (e.g., PhD, EdD)	26	9.1	9.1	95.1
Associate degree - academic program	6	2.1	2.1	97.2
Associate degree / technical diploma - occupational / technical / vocational program	3	1.0	1.0	98.3
Other	5	1.7	1.7	100.0
Total	286	100.0	100.0	

Table 93: MOOCs enrolled * MOOCs completed Crosstabulation

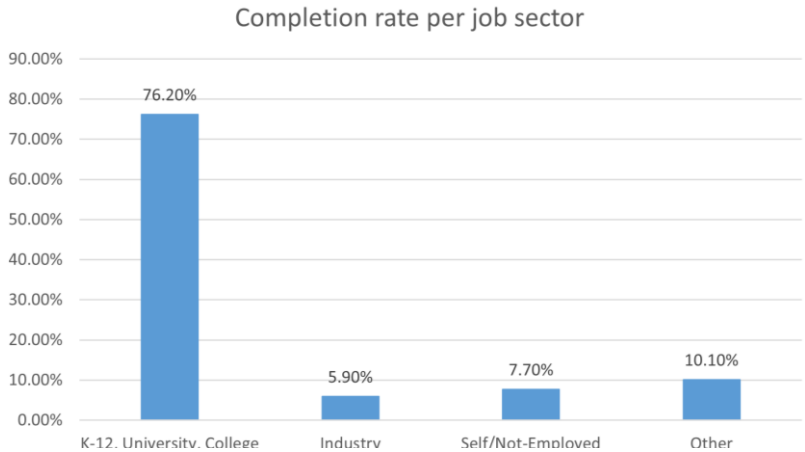
			MOOCs completed					Total
			>10	1	2-4	5-10	None	
MOOCs enrolled	>10	Count	25	0	0	4	0	29
		% within MOOCs completed	100.0%	0.0%	0.0%	11.1%	0.0%	10.1%
	1	Count	0	28	0	0	20	48
		% within MOOCs completed	0.0%	80.0%	0.0%	0.0%	16.9%	16.7%
	2-4	Count	0	5	**68**	2	4	79
		% within MOOCs completed	0.0%	14.3%	**93.2%**	5.6%	3.4%	27.5%
	5-10	Count	0	2	5	30	0	37
		% within MOOCs completed	0.0%	5.7%	6.8%	83.3%	0.0%	12.9%
	None	Count	0	0	0	0	94	94
		% within MOOCs completed	0.0%	0.0%	0.0%	0.0%	79.7%	32.8%
Total		Count	25	35	73	36	118	287
		% within MOOCs completed	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 94: Job Sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	K-12 Education	148	51.7	51.7	51.7
	University	63	22.0	22.0	73.8
	Governmental Education Agency	20	7.0	7.0	80.8
	Not-employed	14	4.9	4.9	85.7
	Large (>100 people) for-profit company	8	2.8	2.8	88.5

	Self-employed	8	2.8	2.8	91.3
	College	7	2.4	2.4	93.7
	Small (<100 people) for-profit company	6	2.1	2.1	95.8
	Large (>100 people) non-profit	2	0.7	0.7	96.5
	Other Governmental Agency	2	0.7	0.7	97.2
	Small (<100 people) non-profit	1	0.3	0.3	97.6
	Other	7	2.4	2.4	100.0
	Total	286	100.0	100.0	

Job Sector Groups: 218 (76.2%) K-12, University, or College; 17 (5.9%) Industry (Small/Large – for/non-profit); 22 (7.7%) Self/Not-employed; 29 (10.1%) Other



Job role:

Table 95: Distribution of participants who completed the course per professional role

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	School Teacher	164	57.3	57.3	57.3
	Higher Education Student	57	19.9	19.9	77.3
	eLearning Professional	26	9.1	9.1	86.4
	Expert with Experience in EDL	11	3.8	3.8	90.2
	Manager in (Online) Education/Training	8	2.8	2.8	93.0
	Academic/Researcher in ID and/or Online Education/Training	7	2.4	2.4	95.5
	Other	13	4.5	4.5	100.0
	Total	286	100.0	100.0	

Experience in professional role

Table 96: Years in job role (M=12.08, SD=8.466)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5	109	38.1	38.1	38.1
	6-10	22	7.7	7.7	45.8
	11-20	100	35.0	35.0	80.8
	21+	55	19.2	19.2	100.0
	Total	286	100.0	100.0	

Table 97:Years in Digital Teaching and Learning (M=6.55, SD=5.829)

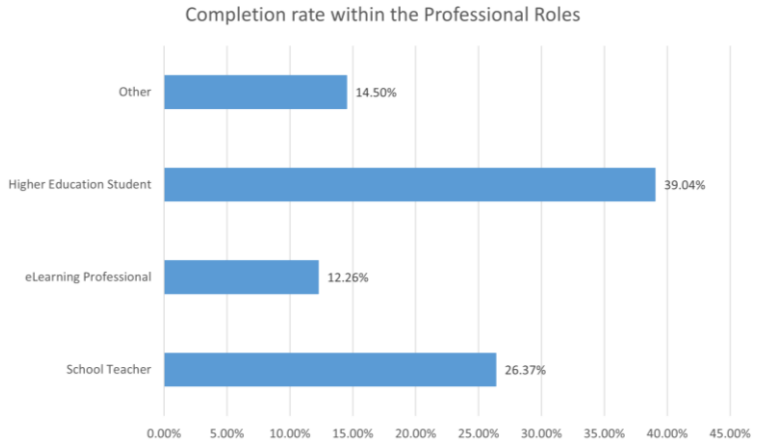
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5	178	62.2	62.2	62.2
	6-10	62	21.7	21.7	83.9
	11-20	33	11.5	11.5	95.5
	21+	13	4.5	4.5	100.0
	Total	286	100.0	100.0	

Table 98: Course completion within each targeted group

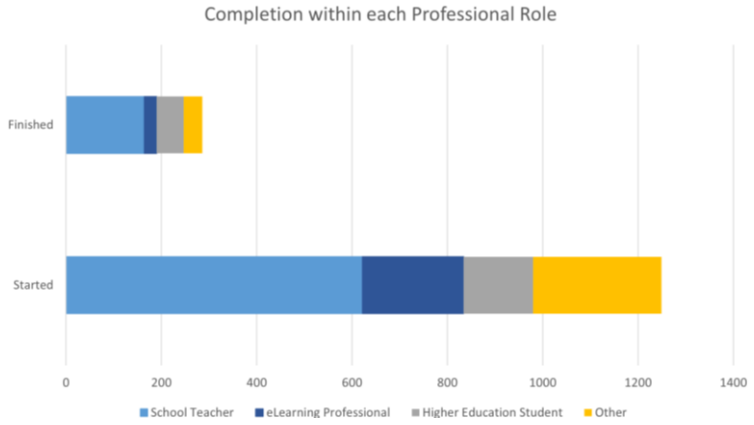
Completion

NumGroup	Completed	Started	Mean	Std. Deviation
eLearning Professionals	26	212	.12	.334
Higher Education Students	57	146	.39	.490
School Teachers	164	622	.26	.441
Others	39	269	.14	.353
Total	286	1249	.23	.421

a. Completion rate within each professional role



b. Comparison of starters to completers with respect to their professional roles



Statistical difference in completion between the targeted groups

Table 99: ANOVA - completion between the targeted groups

Completion

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.640	3	2.880	16.880	.000
Within Groups	212.412	1245	.171		
Total	221.052	1248			

Statistical difference in completion between the pairs of participants' targeted groups

Table 100: Independent Samples Test: eLearning professionals - School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Completion	Equal variances assumed	90.490	.000	-4.115	832	.000	-.136	.033	-.201	-.071
	Equal variances not assumed			-4.705	478.531	.000	-.136	.029	-.193	-.079

Table 101: Independent Samples Test: eLearning professionals - Higher Education Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Completion	Equal variances assumed	134.256	.000	-6.044	356	.000	-.263	.044	-.349	-.177
	Equal variances not assumed			-5.649	236.276	.000	-.263	.047	-.355	-.171

Table 102: Independent Samples Test: Higher Education Students and School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Completion	Equal variances assumed	24.310	.000	3.059	766	.002	.127	.041	.045	.208
	Equal variances not assumed			2.867	203.773	.005	.127	.044	.040	.214

Distribution of participants who completed the course per professional role with respect to their experience (in years)

Table 103: **Years in role * Professional Role Crosstabulation**

			Professional Role							
			eLearning Professional	Higher Education Student	School Teacher	Academic/ Researcher in ID and/or Online Education/ Training	Expert with Experience in EDL	Manager in (Online) Education /Training	Other	Total
Years in role	1-5	Count	15	55	16	4	4	5	10	109
		% of Total	5.2%	19.2%	5.6%	1.4%	1.4%	1.7%	3.5%	38.1%
	6-10	Count	6	1	9	3	3	0	0	22
		% of Total	2.1%	0.3%	3.1%	1.0%	1.0%	0.0%	0.0%	7.7%
	11-20	Count	3	1	87	0	4	2	3	100
		% of Total	1.0%	0.3%	30.4%	0.0%	1.4%	0.7%	1.0%	35.0%
	21+	Count	2	0	52	0	0	1	0	55
		% of Total	0.7%	0.0%	18.2%	0.0%	0.0%	0.3%	0.0%	19.2%
Total		Count	26	57	164	7	11	8	13	286
		% of Total	9.1%	19.9%	57.3%	2.4%	3.8%	2.8%	4.5%	100.0%

b) Motivational profiles

Table 104: Distribution of Goals for participants who completed the course

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Auditing, but do not intend to follow the course schedule	3	1.0	1.0	1.0
	Auditing, but intend to follow the course schedule	12	4.2	4.2	5.2
	Bookmaking it as a learning resource	11	3.8	3.8	9.1
	Expertising to Educational Data Analyze for my career	1	.3	.3	9.4
	General curiosity	17	5.9	5.9	15.4
	I am fully interested in the learning outcomes of the course	1	.3	.3	15.7
	I think the skills and knowledge this course provides will aid me in current and future career	1	.3	.3	16.1
	integrate and professionalize digital competences in teacher education	1	.3	.3	16.4
	Interested in a small subset of course topics	6	2.1	2.1	18.5
	Just checking what this course is about	11	3.8	3.8	22.4
	NEW KNOWLEDGE	1	.3	.3	22.7
	Planning to follow the course schedule and complete all activities to earn a certificate of completion	220	76.9	76.9	99.7
	University Credits	1	.3	.3	100.0
	Total	286	100.0	100.0	

Table 105: Descriptive Statistics: reasons for enrolment

	N	Minimum	Maximum	Mean	Std. Deviation
M1	286	0	5	4.26	1.113
M2	286	0	5	4.37	1.192
M3	286	0	5	3.31	1.507
M4	286	0	5	3.70	1.483
M5	286	0	5	3.52	1.593
M6	286	0	5	2.83	1.806
M7	286	0	5	2.06	1.540
M8	286	0	5	2.80	1.484
Valid N (listwise)	286				

Statistical difference in Reasons for enrolment between **Completers - Droppers**

Table 106: Independent Samples Test: Completers vs. Droppers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
M1	Equal variances assumed	.010	.921	-.229	1247	.819	-.01704	.07433	-.16287	.12879
	Equal variances not assumed			-.228	466.8	.819	-.01704	.07464	-.16371	.12962
M2	Equal variances assumed	.394	.530	-.017	1247	.987	-.00141	.08350	-.16523	.16240
	Equal variances not assumed			-.017	492.6	.986	-.00141	.08099	-.16054	.15772
M3	Equal variances assumed	.005	.945	-2.320	1247	.020	-.23636	.10187	-.43622	-.03650
	Equal variances not assumed			-2.332	473.4	.020	-.23636	.10135	-.43551	-.03721
M4	Equal variances assumed	**1.041**	**.308**	**-3.145**	1247	**.002**	-.31604	.10048	-.51317	-.11891
	Equal variances not assumed			-3.158	472.5	**.002**	-.31604	.10008	-.51269	-.11939
M5	Equal variances assumed	1.023	.312	-1.344	1247	.179	-.14641	.10894	-.36014	.06732
	Equal variances not assumed			-1.364	480.4	.173	-.14641	.10736	-.35735	.06454

M6	Equal variances assumed	.000	.992	-1.943	1247	.052	-.23131	.11905	-.46487	.00226
	Equal variances not assumed			-1.917	460.3	.056	-.23131	.12068	-.46846	.00585
M7	Equal variances assumed	**9.256**	**.002**	**-3.099**	1247	**.002**	-.29978	.09675	-.48959	-.10998
	Equal variances not assumed			-2.943	436.4	**.003**	-.29978	.10187	-.50000	-.09956
M8	Equal variances assumed	2.894	.089	1.901	1247	.057	.20448	.10754	-.00651	.41546
	Equal variances not assumed			1.998	508.3	.046	.20448	.10235	.00339	.40557

Reasons for enrolment (Per professional role)

Table 107: Reasons for enrolment (Per professional role)

ProfRolesGroups		M1	M2	M3	M4	M5	M6	M7	M8
eLearning Professional	Mean	4.69	4.92	3.38	3.69	3.38	2.50	1.92	3.08
	N	26	26	26	26	26	26	26	26
	Std. Deviation	0.679	0.392	1.722	1.806	1.722	1.860	1.623	1.440
Higher Education Student	Mean	3.49	3.75	3.35	3.72	3.93	3.12	3.18	2.56
	N	57	57	57	57	57	57	57	57
	Std. Deviation	1.182	1.199	1.445	1.346	1.534	2.130	1.692	1.389
School Teacher	Mean	4.40	4.48	3.23	3.61	3.36	2.79	1.74	2.82
	N	164	164	164	164	164	164	164	164
	Std. Deviation	1.100	1.195	1.512	1.529	1.582	1.648	1.314	1.516
Other	Mean	4.55	4.56	3.66	4.03	3.81	2.91	1.77	2.93
	N	39	39	39	39	39	39	39	39
	Std. Deviation	0.704	0.780	1.344	1.265	1.257	1.879	1.341	1.529
Total	Mean	4.26	4.37	3.31	3.70	3.52	2.83	2.06	2.80
	N	286	286	286	286	286	286	286	286
	Std. Deviation	1.113	1.192	1.507	1.483	1.593	1.806	1.540	1.484

Statistical difference in **Reasons for enrolment** between **the different Professional roles**

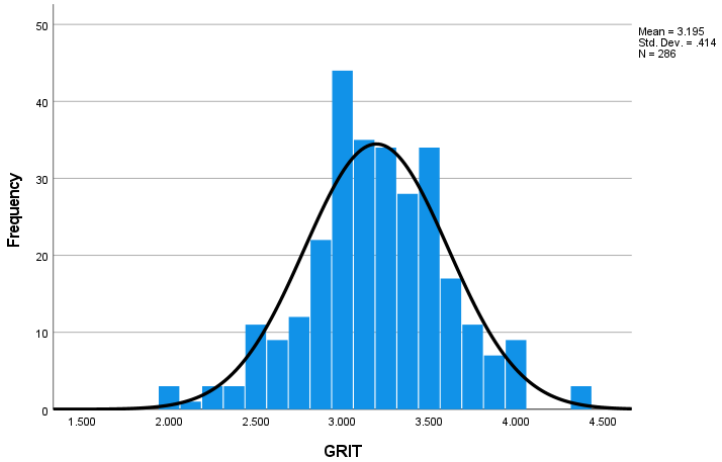
Table 108: ANOVA - Reasons for enrolment between the different Professional roles

		Sum of Squares	df	Mean Square	F	Sig.
M1	Between Groups	44.618	3	14.873	**13.586**	**.000**
	Within Groups	308.714	282	1.095		
	Total	353.332	285			
M2	Between Groups	31.915	3	10.638	**8.042**	**.000**
	Within Groups	373.054	282	1.323		
	Total	404.969	285			
M3	Between Groups	3.926	3	1.309	.574	.633
	Within Groups	643.378	282	2.281		
	Total	647.304	285			
M4	Between Groups	5.489	3	1.830	.831	.478
	Within Groups	621.046	282	2.202		
	Total	626.535	285			
M5	Between Groups	15.419	3	5.140	2.047	.107
	Within Groups	707.955	282	2.510		
	Total	723.374	285			
M6	Between Groups	7.994	3	2.665	.815	.486
	Within Groups	921.951	282	3.269		
	Total	929.944	285			
M7	Between Groups	89.577	3	29.859	**14.359**	**.000**
	Within Groups	586.413	282	2.079		
	Total	675.990	285			
M8	Between Groups	5.657	3	1.886	.855	.465
	Within Groups	621.983	282	2.206		
	Total	627.640	285			

GRIT Score

Table 109: **Descriptive Statistics – GRIT Score**

	N	Minimum	Maximum	Mean	Std. Deviation
GRIT1	286	1	5	2.68	1.121
GRIT2	286	1	5	3.53	1.052
GRIT3	286	1	5	2.43	.995
GRIT4	286	1	5	4.23	.964
GRIT5	286	1	5	2.26	.967
GRIT6	286	1	5	2.24	1.060
GRIT7	286	1	5	4.04	1.030
GRIT8	286	1	5	4.15	.934
GRIT	286	2.00	4.38	3.20	.414
Valid N	286				



Statistical difference in **GRIT score** between **completers and droppers**

Table 110: Group Statistics - GRIT score between completers and droppers

	Completion	N	Mean	Std. Deviation	Std. Error Mean
GRIT1	No	962	2.8669	1.09534	.03532
	Yes	287	2.6829	1.12216	.06624
GRIT2	No	962	3.4480	1.01082	.03259
	Yes	287	3.5366	1.05341	.06218
GRIT3	No	962	2.5104	1.01107	.03260
	Yes	287	2.4425	.99790	.05890
GRIT4	No	962	4.1112	.98220	.03167
	Yes	287	4.2195	.96652	.05705
GRIT5	No	962	2.4615	1.03280	.03330
	Yes	287	2.2648	.97140	.05734
GRIT6	No	962	2.3971	1.09976	.03546
	Yes	287	2.2474	1.06014	.06258
GRIT7	No	962	3.8015	1.02268	.03297
	Yes	287	4.0348	1.03040	.06082
GRIT8	No	962	3.9366	1.01145	.03261
	Yes	287	4.1429	.93334	.05509
GRIT	No	962	3.1917	.48241	.01555
	Yes	287	3.1964	.41499	.02450

Table 111: Independent Samples Test: Completers - Droppers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
GRIT1	Equal variances assumed	2.280	.131	2.484	1247	.013	.18402	.07409	.03866	.32937
	Equal variances not assumed			2.451	460.62	.015	.18402	.07507	.03650	.33153
GRIT2	Equal variances assumed	1.199	.274	-1.290	1247	.197	-.08856	.06865	-.22325	.04613
	Equal variances not assumed			-1.261	454.50	.208	-.08856	.07020	-.22652	.04940
GRIT3	Equal variances assumed	.141	.708	1.001	1247	.317	.06789	.06780	-.06513	.20090
	Equal variances not assumed			1.008	474.76	.314	.06789	.06732	-.06440	.20017
GRIT4	Equal variances assumed	.008	.929	-1.645	1247	.100	-.10829	.06582	-.23742	.02085
	Equal variances not assumed			-1.660	475.93	.098	-.10829	.06525	-.23650	.01993
GRIT5	Equal variances assumed	3.505	.061	2.870	1247	.004	.19673	.06854	.06226	.33120
	Equal variances not assumed			2.967	494.69	.003	.19673	.06631	.06645	.32701
GRIT6	Equal variances assumed	1.731	.189	2.040	1247	.042	.14970	.07337	.00577	.29364
	Equal variances not assumed			2.081	484.27	.038	.14970	.07193	.00838	.29103
GRIT7	Equal variances assumed	2.457	.117	-3.387	1247	.001	-.23339	.06890	-.36857	-.09821
	Equal variances not assumed			-3.373	466.80	.001	-.23339	.06918	-.36934	-.09744

GRIT8	Equal variances assumed	.027	.870	-3.085	1247	.002	-.20627	.06686	-.33744	-.07509
	Equal variances not assumed			-3.222	503.13	.001	-.20627	.06402	-.33205	-.08048
GRIT	Equal variances assumed	2.859	.091	-.152	1247	.880	-.00477	.03146	-.06650	.05696
	Equal variances not assumed			-.164	537.11	.869	-.00477	.02902	-.06177	.05223

GRIT score for **the targeted professional roles** of **completers**

Table 112: GRIT score for the targeted professional roles of completers

ProfRole		GRIT1	GRIT2	GRIT3	GRIT4	GRIT5	GRIT6	GRIT7	GRIT8	GRIT
eLearning Professional	Mean	3.00	3.54	2.58	4.50	2.23	1.96	4.12	4.46	3.30
	N	26	26	26	26	26	26	26	26	26
	Std. Deviation	1.095	0.811	0.987	0.583	1.032	0.871	0.766	0.647	0.294
Higher Education Student	Mean	2.95	3.28	2.68	3.86	2.70	2.77	3.75	3.63	3.20
	N	57	57	57	57	57	57	57	57	57
	Std. Deviation	0.833	0.996	0.985	1.008	0.963	1.018	1.005	0.919	0.389
School Teacher	Mean	2.51	3.65	2.33	4.32	2.07	2.08	4.15	4.32	3.18
	N	164	164	164	164	164	164	164	164	164
	Std. Deviation	1.159	1.078	0.991	0.97	0.908	1.045	1.052	0.898	0.423
Other	Mean	2.80	3.48	2.45	4.23	2.44	2.38	3.90	3.94	3.20
	N	39	39	39	39	39	39	39	39	39
	Std. Deviation	1.258	1.071	1.013	0.925	0.984	1.042	0.989	0.955	0.474
Total	Mean	2.68	3.53	2.43	4.23	2.26	2.24	4.04	4.15	3.20
	N	286	286	286	286	286	286	286	286	286
	Std. Deviation	1.121	1.052	0.995	0.964	0.967	1.06	1.03	0.934	0.414

Statistical difference in **GRIT score** between **the professional roles of completers**

Table 113: ANOVA - GRIT score between the professional roles of completers

		Sum of Squares	df	Mean Square	F	Sig.
GRIT1	Between Groups	11.665	3	3.888	**3.162**	**.025**
	Within Groups	346.741	282	1.230		
	Total	358.406	285			
GRIT2	Between Groups	6.102	3	2.034	1.856	.137
	Within Groups	309.048	282	1.096		
	Total	315.150	285			
GRIT3	Between Groups	5.920	3	1.973	2.014	.112
	Within Groups	276.317	282	.980		
	Total	282.238	285			
GRIT4	Between Groups	10.957	3	3.652	**4.058**	**.008**
	Within Groups	253.812	282	.900		
	Total	264.769	285			
GRIT5	Between Groups	18.124	3	6.041	**6.863**	**.000**
	Within Groups	248.243	282	.880		
	Total	266.367	285			
GRIT6	Between Groups	22.720	3	7.573	**7.176**	**.000**
	Within Groups	297.633	282	1.055		
	Total	320.353	285			
GRIT7	Between Groups	6.976	3	2.325	2.218	.086
	Within Groups	295.600	282	1.048		
	Total	302.577	285			
GRIT8	Between Groups	23.298	3	7.766	**9.723**	**.000**
	Within Groups	225.237	282	.799		
	Total	248.535	285			
GRIT	Between Groups	.335	3	.112	.650	.583
	Within Groups	48.452	282	.172		
	Total	48.787	285			

Self-confidence to learn material:

Table 114: Self-confidence to learn material

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not confident at all	13	4.5	4.5	4.5
	A little confident	25	8.7	8.7	13.2
	Moderately confident	102	35.7	35.7	48.9
	Very confident	119	41.6	41.6	90.5
	Extremely confident	27	9.4	9.4	100.0
	Total	286	100.0	100.0	

Time commitment:

Table 115: Time Commitment to complete the course on time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	.3	.3	.3
	2	10	3.5	3.5	3.8
	3	74	25.9	25.9	29.7
	4	123	43.0	43.0	72.7
	5	78	27.3	27.3	100.0
	Total	286	100.0	100.0	

Time allocation:

Table 116: Time Allocation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 3 hours	35	12.2	12.2	12.2
	3-4 hours	106	37.1	37.1	49.3
	5-6 hours	82	28.7	28.7	78.0
	7-8 hours	35	12.2	12.2	90.2
	more than 8 hours	28	9.8	9.8	100.0
	Total	286	100.0	100.0	

Statistical difference in **self-confidence to learn material, time commitment, and time allocation** between **completers and droppers**

Table 117: Group Statistics (Completers – Droppers)

	Completion	N	Mean	Std. Deviation	Std. Error Mean
Confidence to learn material	No	962	3.5665	.84627	.02728
	Yes	287	3.4251	.93894	.05542
Time commitment in course	No	962	3.71	.877	.028
	Yes	287	3.93	.838	.049
Time allocation	No	962	4.2048	2.20069	.07095
	Yes	287	4.9007	2.26938	.13396

Table 118: Independent Samples Test: Completers - Droppers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Confidence to learn material	Equal variances assumed	**3.358**	**.067**	**2.422**	1247	**.016**	.14144	.05841	.02685	.25603
	Equal variances not assumed			2.290	433.84	**.023**	.14144	.06178	.02002	.26286
Time commitment in course	Equal variances assumed	**4.589**	**.032**	**-3.738**	1247	**.000**	-.218	.058	-.333	-.104
	Equal variances not assumed			-3.832	488.21	**.000**	-.218	.057	-.330	-.106
Time allocation	Equal variances assumed	**.732**	**.392**	**-4.668**	1247	**.000**	-.69592	.14909	-.98841	-.40342
	Equal variances not assumed			-4.591	458.25	**.000**	-.69592	.15159	-.99381	-.39802

c) EDL Competence advancement

EDL Initial level (per EDL dimension) for the participants that completed the course per targeted group

Table 119: Initial EDL Level per targeted group

Group		D1	D2	D3	D4	D5	D6
eLearning professional	Mean	2.154	1.942	1.904	1.760	1.808	1.846
	N	26	26	26	26	26	26
	Std. Deviation	.903	.864	.800	.770	.776	.719
Higher Education Student	Mean	1.921	1.763	1.991	1.746	1.693	1.661
	N	57	57	57	57	57	57
	Std. Deviation	.890	.794	.904	.809	.784	.689
School Teacher	Mean	2.271	2.099	2.101	1.938	1.951	2.116
	N	164	164	164	164	164	164
	Std. Deviation	1.008	.949	.997	.940	.945	.984
Other	Mean	2.500	2.205	2.282	2.192	2.179	2.274
	N	39	39	39	39	39	39
	Std. Deviation	1.159	1.048	.938	1.011	1.010	1.070
Total	Mean	2.222	2.032	2.086	1.918	1.918	2.022
	N	286	286	286	286	286	286
	Std. Deviation	1.009	.934	.955	.9168	.917	.942

Achieved EDL Level (per EDL dimension) per targeted group after course completion

Table 120: Achieved EDL Level (per dimension) per targeted group

Group		D1_post	D2_post	D3_post	D4_post	D5_post	D6_post
eLearning professional	Mean	3.154	2.894	3.135	3.058	2.923	3.154
	N	26	26	26	26	26	26
	Std. Deviation	.690	.664	.855	.852	.796	.790
Higher Education Student	Mean	2.386	2.382	2.412	2.434	2.412	2.386
	N	57	57	57	57	57	57
	Std. Deviation	.791	.734	.841	.841	.830	.821
School Teacher	Mean	3.152	3.041	3.104	3.092	3.073	3.258
	N	164	164	164	164	164	164
	Std. Deviation	.778	.852	.887	.860	.883	.856
Other	Mean	2.962	2.930	3.000	2.885	2.962	3.000
	N	39	39	39	39	39	39
	Std. Deviation	.928	.825	.960	.916	.962	.908
Total	Mean	2.974	2.881	2.955	2.929	2.912	3.040
	N	286	286	286	286	286	286
	Std. Deviation	.846	.846	.922	.896	.909	.911

Statistical difference in achieved EDL level (per EDL dimension) between all targeted groups

Table 121: ANOVA - Statistical difference in achieved EDL level (per dimension) between all targeted groups

		Sum of Squares	df	Mean Square	F	Sig.
D1_post	Between Groups	25.779	3	8.593	13.592	.000
	Within Groups	178.275	282	.632		
	Total	204.053	285			
D2_post	Between Groups	18.520	3	6.173	9.388	.000
	Within Groups	185.438	282	.658		
	Total	203.958	285			
D3_post	Between Groups	21.331	3	7.110	9.070	.000

	Within Groups	221.078	282	.784		
	Total	242.409	285			
D4_post	Between Groups	18.791	3	6.264	8.403	.000
	Within Groups	210.213	282	.745		
	Total	229.004	285			
D5_post	Between Groups	18.593	3	6.198	8.064	.000
	Within Groups	216.722	282	.769		
	Total	235.315	285			
D6_post	Between Groups	32.585	3	10.862	15.009	.000
	Within Groups	204.077	282	.724		
	Total	236.662	285			

Statistical difference in achieved EDL level (per EDL dimension) between the targeted groups

Table 122: Independent Samples Test: eLearning professionals - Higher Education Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
D1_post	Equal variances assumed	**1.359**	**.247**	**4.264**	81	**.000**	.76788	.18006	.40961	1.12615
	Equal variances not assumed			4.490	55.132	**.000**	.76788	.17103	.42515	1.11062
D2_post	Equal variances assumed	**.301**	**.585**	**3.039**	81	**.003**	.51265	.16870	.17700	.84831
	Equal variances not assumed			3.155	53.225	**.003**	.51265	.16248	.18680	.83850
D3_post	Equal variances assumed	**.134**	**.715**	**3.612**	81	**.001**	.72233	.19998	.32444	1.12023
	Equal variances not assumed			3.589	47.752	**.001**	.72233	.20128	.31757	1.12710
D4_post	Equal variances assumed	**.170**	**.681**	**3.121**	81	**.003**	.62348	.19979	.22597	1.02100
	Equal variances not assumed			3.104	47.891	**.003**	.62348	.20085	.21963	1.02733
D5_post	Equal variances assumed	**.245**	**.622**	**2.634**	81	**.010**	.51080	.19396	.12489	.89671
	Equal variances not assumed			2.675	50.392	**.010**	.51080	.19094	.12735	.89424
D6_post	Equal variances assumed	**.003**	**.954**	**3.999**	81	**.000**	.76788	.19204	.38578	1.14998
	Equal variances not assumed			4.057	50.239	**.000**	.76788	.18929	.38772	1.14804

Table 123: Independent Samples Test: eLearning professionals - School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
D1_post	Equal variances assumed	.290	.591	.009	188	.993	.00141	.16189	-.31794	.32076
	Equal variances not assumed			.009	35.890	.992	.00141	.14824	-.29927	.30209
D2_post	Equal variances assumed	.958	.329	-.839	188	.403	-.14693	.17515	-.49244	.19858
	Equal variances not assumed			-1.005	39.356	.321	-.14693	.14624	-.44264	.14878
D3_post	Equal variances assumed	.028	.867	.166	188	.868	.03096	.18635	-.33665	.39857

	Equal variances not assumed			.171	34.105	.866	.03096	.18143	-.33772	.39963
D4_post	Equal variances assumed	.106	.745	-.186	188	.852	-.03377	.18137	-.39156	.32402
	Equal variances not assumed			-.187	33.592	.852	-.03377	.18016	-.40006	.33251
D5_post	Equal variances assumed	.015	.903	-.815	188	.416	-.15009	.18408	-.51322	.21304
	Equal variances not assumed			-.879	35.497	.385	-.15009	.17069	-.49643	.19625
D6_post	Equal variances assumed	.313	.577	-.583	188	.561	-.10428	.17889	-.45717	.24860
	Equal variances not assumed			-.618	34.981	.541	-.10428	.16875	-.44688	.23831

Table 124: Independent Samples Test: School Teachers and Higher Education Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
D1_post	Equal variances assumed	**.704**	**.402**	**-6.380**	219	**.000**	-.76647	.12014	-1.00325	-.52970
	Equal variances not assumed			-6.331	96.297	**.000**	-.76647	.12108	-1.00680	-.52615
D2_post	Equal variances assumed	**.479**	**.490**	**-5.209**	219	**.000**	-.65958	.12663	-.90916	-.41000
	Equal variances not assumed			-5.600	112.372	**.000**	-.65958	.11778	-.89293	-.42623
D3_post	Equal variances assumed	**.066**	**.798**	**-5.137**	219	**.000**	-.69138	.13459	-.95663	-.42612
	Equal variances not assumed			-5.273	102.466	**.000**	-.69138	.13111	-.95143	-.43133
D4_post	Equal variances assumed	**.024**	**.877**	**-4.998**	219	**.000**	-.65725	.13150	-.91643	-.39808
	Equal variances not assumed			-5.055	99.658	**.000**	-.65725	.13003	-.91524	-.39927
D5_post	Equal variances assumed	**.196**	**.659**	**-4.942**	219	**.000**	-.66089	.13374	-.92447	-.39731
	Equal variances not assumed			-5.093	103.268	**.000**	-.66089	.12975	-.91822	-.40356
D6_post	Equal variances assumed	**.448**	**.504**	**-6.696**	219	**.000**	-.87217	.13024	-1.12885	-.61548
	Equal variances not assumed			-6.834	101.348	**.000**	-.87217	.12762	-1.12532	-.61901

Statistical difference in Advancement in EDL (per EDL Dimension) – i.e., the difference from Initial to Achieved – for each targeted group (within the group)

Table 125: Paired Samples Test for eLearning Professionals

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	D1 - D1_post	-1.000	1.030	.202	-1.41585	-.58415	-4.953	25	.000
Pair 2	D2 - D2_post	-.952	.886	.174	-1.30981	-.59404	-5.478	25	.000
Pair 3	D3 - D3_post	-1.231	.992	.195	-1.63156	-.82998	-6.325	25	.000
Pair 4	D4 - D4_post	-1.298	.806	.158	-1.62374	-.97241	-8.209	25	.000
Pair 5	D5 - D5_post	-1.115	.875	.172	-1.46893	-.76184	-6.498	25	.000
Pair 6	D6 - D6_post	-1.308	.947	.186	-1.690	-.925	-7.040	25	.000

Table 126: Paired Samples Test for Higher Education Students

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	D1 - D1_post	-.465	.981	.130	-.72530	-.20453	-3.577	56	.001
Pair 2	D2 - D2_post	-.618	.744	.099	-.81588	-.42096	-6.274	56	.000
Pair 3	D3 - D3_post	-.421	.939	.124	-.67025	-.17186	-3.385	56	.001
Pair 4	D4 - D4_post	-.689	.802	.106	-.90144	-.47575	-6.481	56	.000
Pair 5	D5 - D5_post	-.719	.861	.114	-.94774	-.49086	-6.308	56	.000
Pair 6	D6 - D6_post	-.725	.841	.111	-.94822	-.50207	-6.512	56	.000

Table 127: Paired Samples Test for School Teachers

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	D1 - D1_post	-.881	1.018	.080	-1.03807	-.72412	-11.084	163	.000
Pair 2	D2 - D2_post	-.942	.996	.078	-1.09559	-.78856	-12.118	163	.000
Pair 3	D3 - D3_post	-1.003	.974	.076	-1.15329	-.85281	-13.183	163	.000
Pair 4	D4 - D4_post	-1.154	.984	.077	-1.30568	-1.00225	-15.019	163	.000
Pair 5	D5 - D5_post	-1.122	1.076	.084	-1.28779	-.95611	-13.359	163	.000
Pair 6	D6 - D6_post	-1.142	1.071	.084	-1.30738	-.97716	-13.661	163	.000

Advancement in EDL Level (per EDL dimension) per targeted group after course completion

Table 128: Advancement in EDL Level per targeted group

Group		D1_adv	D2_adv	D3_adv	D4_adv	D5_adv	D6_adv
eLearning professional	Mean	1.000	0.952	1.231	1.298	1.115	1.308
	N	26	26	26	26	26	26
	Std. Deviation	1.03	0.886	0.992	0.806	0.875	0.947
Higher Education Student	Mean	0.465	0.618	0.421	0.689	0.719	0.725
	N	57	57	57	57	57	57
	Std. Deviation	0.981	0.744	0.939	0.802	0.861	0.841
School Teacher	Mean	0.881	0.942	1.003	1.154	1.122	1.142
	N	164	164	164	164	164	164
	Std. Deviation	1.018	0.996	0.974	0.984	1.076	1.071
Total	Mean	0.752	0.849	0.869	1.011	0.995	1.018
	N	286	286	286	286	286	286
	Std. Deviation	1.044	0.952	0.994	0.959	1.045	1.027

Statistical difference in Advancement in EDL level (per EDL dimension) for the pairs of targeted groups

Table 129: Independent Samples Test: eLearning professionals - Higher Education Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
D1_adv	Equal variances assumed	**.090**	**.765**	**2.269**	81	**.026**	.53509	.23582	.06588	1.00430
	Equal variances not assumed			2.228	46.453	**.031**	.53509	.24013	.05185	1.01833
D2_adv	Equal variances assumed	.889	.348	1.782	81	.078	.33350	.18712	-.03881	.70581
	Equal variances not assumed			1.669	41.747	.103	.33350	.19978	-.06974	.73675
D3_adv	Equal variances assumed	**.026**	**.873**	**3.579**	81	**.001**	.80972	.22621	.35962	1.25981
	Equal variances not assumed			3.506	46.164	**.001**	.80972	.23096	.34485	1.27458
D4_adv	Equal variances assumed	**.008**	**.927**	**3.205**	81	**.002**	.60948	.19014	.23116	.98780
	Equal variances not assumed			3.199	48.278	**.002**	.60948	.19051	.22650	.99246
D5_adv	Equal variances assumed	.666	.417	1.934	81	.057	.39609	.20480	-.01140	.80358
	Equal variances not assumed			1.922	47.780	.061	.39609	.20609	-.01833	.81050
D6_adv	Equal variances assumed	**.025**	**.874**	**2.813**	81	**.006**	.58255	.20706	.17055	.99454

	Equal variances not assumed			2.690	43.680	**.010**	.58255	.21657	.14598	1.01911

Table 130: Independent Samples Test: eLearning professionals - School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
D1_adv	Equal variances assumed	.035	.851	.552	188	.581	.11890	.21522	-.30566	.54346
	Equal variances not assumed			.548	33.228	.587	.11890	.21700	-.32247	.56028
D2_adv	Equal variances assumed	.798	.373	.048	188	.962	.00985	.20724	-.39896	.41866
	Equal variances not assumed			.052	35.790	.959	.00985	.19037	-.37631	.39601
D3_adv	Equal variances assumed	.009	.923	1.104	188	.271	.22772	.20618	-.17901	.63445
	Equal variances not assumed			1.090	33.109	.284	.22772	.20895	-.19733	.65277
D4_adv	Equal variances assumed	1.908	.169	.710	188	.479	.14411	.20311	-.25655	.54478
	Equal variances not assumed			.820	37.874	.417	.14411	.17580	-.21182	.50005
D5_adv	Equal variances assumed	2.638	.106	-.030	188	.976	-.00657	.22188	-.44427	.43113
	Equal variances not assumed			-.034	38.067	.973	-.00657	.19111	-.39342	.38028
D6_adv	Equal variances assumed	1.102	.295	.743	188	.459	.16542	.22274	-.27398	.60481
	Equal variances not assumed			.812	35.932	.422	.16542	.20370	-.24774	.57857

Table 131: Independent Samples Test: School Teachers - Higher Education Students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
D1_adv	Equal variances assumed	**.539**	**.464**	**-2.683**	219	**.008**	-.41619	.15511	-.72188	-.11049
	Equal variances not assumed			-2.732	100.878	**.007**	-.41619	.15236	-.71844	-.11393
D2_adv	Equal variances assumed	**6.432**	**.012**	**-2.245**	219	**.026**	-.32365	.14419	-.60783	-.03948
	Equal variances not assumed			-2.578	130.055	**.011**	-.32365	.12554	-.57202	-.07529
D3_adv	Equal variances assumed	**.011**	**.918**	**-3.920**	219	**.000**	-.58200	.14845	-.87457	-.28942
	Equal variances not assumed			-3.991	100.885	**.000**	-.58200	.14582	-.87127	-.29272
D4_adv	Equal variances assumed	**4.181**	**.042**	**-3.217**	219	**.001**	-.46537	.14465	-.75046	-.18027
	Equal variances not assumed			-3.549	118.723	**.001**	-.46537	.13112	-.72500	-.20573
D5_adv	Equal variances assumed	**1.687**	**.195**	**-2.555**	219	**.011**	-.40265	.15760	-.71325	-.09205
	Equal variances not assumed			-2.843	120.998	**.005**	-.40265	.14163	-.68304	-.12227
D6_adv	Equal variances assumed	**3.001**	**.085**	**-2.668**	219	**.008**	-.41713	.15636	-.72530	-.10896
	Equal variances not assumed			-2.995	123.465	**.003**	-.41713	.13926	-.69277	-.14149

Gamification Attitude

Table 132: My attitude towards gamification is favorable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	13	4.5	4.5	4.5
	4	64	22.4	22.4	26.9
	Not Applicable	8	2.8	2.8	29.7
	Not at all true	7	2.4	2.4	32.2
	Somewhat true	64	22.4	22.4	54.5
	Very true	130	45.5	45.5	100.0
	Total	286	100.0	100.0	

Gamification User Types

Table 133: GamificationUserType of participants who completed the course

	Frequency	Percent	Valid Percent	Cumulative Percent
Multitype	98	34.3	34.3	59.4
Philanthropist	66	23.1	23.1	82.5
Socializer	40	14.0	14.0	100.0
Achiever	36	12.6	12.6	12.6
FreeSpirit	30	10.5	10.5	25.2
Player	10	3.5	3.5	86.0
Disruptor	6	2.1	2.1	14.7

Table 134: Descriptive Statistics for Gamification User Types of participants who completed the course

	N	Minimum	Maximum	Mean	Std. Deviation
Achiever	286	7.00	28.00	22.5909	4.16550
Philanthropist	286	9.00	28.00	23.4930	3.87773
FreeSpirit	286	8.00	28.00	22.0839	3.84798
Disruptor	286	4.00	28.00	14.9056	4.82408
Player	286	7.00	28.00	19.0874	4.32488
Socializer	286	6.00	28.00	21.8427	4.76976
Valid N (listwise)	286				

Appendix B.4 – Relations of Motives to Completion and EDL advancement

Table 135: Correlations: Reason for enrolment, Internal/External motives – Completion rate

		M1	M2	M3	M4	M5	M6	M7	M8	Int Motiv.	Ext Motiv.	Motivation
Completion	Pearson Correlation	0.006	0.000	**.066***	**.089****	0.038	0.055	**.087****	-0.054	0.019	**.109****	**.068***
	Sig. (2-tailed)	0.819	0.987	**0.020**	**0.002**	0.179	0.052	**0.002**	0.057	0.513	**0.000**	**0.016**
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 136: Correlations: GRIT Score – Completion rate

		GRIT1	GRIT2	GRIT3	GRIT4	GRIT5	GRIT6	GRIT7	GRIT8	GRIT
Completion	Pearson Correlation	**-.070***	.037	-.028	.047	**-.081****	**-.058***	**.095****	**.087****	.004
	Sig. (2-tailed)	**.013**	.197	.317	.100	**.004**	**.042**	**.001**	**.002**	.880
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 137: Correlations: Self-confidence, time-allocation – Completion rate

		Confidence to learn material	Time commitment in course	Time allocation
Completion	Pearson Correlation	**-.068***	**.105****	**.131****
	Sig. (2-tailed)	**.016**	**.000**	**.000**
	N	1249	1249	1249

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Internal motives to completion rates

Table 138: Internal motives to completion rates

CompletionRate IntMotivation	Mean	N	Std. Deviation
.00	.2298	6	.17093
.20	.5730	1	.
.40	.3319	2	.34090
.60	.3319	2	.34090
.80	.4108	5	.22322
1.00	.5730	2	.00000
1.20	.3590	4	.25104
1.40	.2666	3	.26628
1.60	.4173	9	.23390
1.80	.2662	10	.21538
2.00	.3435	29	.22699
2.20	.3278	12	.22061
2.40	.3492	33	.22271
2.60	.3514	62	.22539
2.80	.3698	69	.22197
3.00	.3117	125	.22349
3.20	.3701	91	.21744
3.40	.3887	127	.21992

3.60	.3950	90	.21596
3.80	.3371	116	.22267
4.00	.3398	113	.22202
4.20	.3665	97	.21995
4.40	.3713	76	.21647
4.60	.3633	62	.21970
4.80	.3187	42	.21385
5.00	.3069	61	.21857
Total	.3533	1249	.22072

External motives to completion rates

Table 139: External motives to completion rates

CompletionRate

ExtMotivation	Mean	N	Std. Deviation
.00	.3227	16	.22939
.33	.4018	11	.23786
.67	.3222	9	.24030
1.00	.3597	48	.22576
1.33	.3629	60	.22745
1.67	.3634	106	.22422
2.00	.3690	110	.22556
2.33	.3704	133	.22557
2.67	.3675	113	.22128
3.00	.3429	170	.21993
3.33	.3358	105	.22099
3.67	.3764	165	.21783
4.00	.3406	76	.21257
4.33	.3188	49	.20696
4.67	.3299	22	.20901
5.00	.2764	56	.20894
Total	.3533	1249	.22072

Table 140: Correlations: Reasons for enrolment, internal/external motive – EDL competence advancement

		M1	M2	M3	M4	M5	M6	M7	M8	IntMotivation	ExtMotivation	Motivation
EDL_adv	Pearson Correlation	.067	-.021	.064	-.007	-.084	-.073	-.084	-.067	-.073	-.014	-.057
	Sig. (2-tailed)	.257	.724	.279	.902	.157	.219	.156	.260	.219	.817	.336
	N	286	286	286	286	286	286	286	286	286	286	286

Table 141: Correlations: Reasons for enrolment, internal/external motive – EDL competence advancement

		M1	M2	M3	M4	M5	M6	M7	M8	IntMotivation	ExtMotivation	Motivation
EDL_adv	Pearson Correlation	.067	-.021	.064	-.007	-.084	-.073	-.084	-.067	-.073	-.014	-.057
	Sig. (2-tailed)	.257	.724	.279	.902	.157	.219	.156	.260	.219	.817	.336
	N	286	286	286	286	286	286	286	286	286	286	286

Table 142: Correlations: GRIT Score – EDL competence advancement

		EDL_adv	GRIT1	GRIT2	GRIT3	GRIT4	GRIT5	GRIT6	GRIT7	GRIT8	GRIT
EDL_adv	Pearson Correlation	1	-.105	-.104	.024	.045	-.004	.003	.041	**.122***	-.001
	Sig. (2-tailed)		.076	.078	.685	.444	.949	.956	.491	**.039**	.984
	N	286	286	286	286	286	286	286	286	286	286

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix C.1 – Evaluation of Learning Experience

a) Rating per module

Table 143: Descriptive statistics of ratings per Module

		Module2	Module3	Module4	Module5	Module6	Module7
1. Learning Objectives	Mean	4.3509	4.3322	4.3007	4.2972	4.2762	4.2448
	N	285	286	286	286	286	286
	Std. Deviation	0.69938	0.73376	0.75426	0.76259	0.76130	0.78331
2. Comprehensible Content	Mean	4.2133	4.1818	4.1538	4.1259	4.1259	4.0350
	N	286	286	286	286	286	286
	Std. Deviation	0.77230	0.77809	0.76601	0.80234	0.79795	0.86176
3. Relevant Educational Materials	Mean	4.3671	4.2832	4.2727	4.2657	4.2238	4.2168
	N	286	286	286	286	286	286
	Std. Deviation	0.72657	0.78150	0.78299	0.77642	0.78958	0.79595
4. Up-to-date Information	Mean	4.3147	4.3077	4.2972	4.2692	4.2832	4.2587
	N	286	286	286	286	286	286
	Std. Deviation	0.74852	0.78343	0.76259	0.80844	0.78597	0.82686
5. Instructional Videos	Mean	4.2168	4.1993	4.1923	4.1189	4.1154	4.0455
	N	286	286	286	286	286	286
	Std. Deviation	0.89552	0.86985	0.83018	0.89826	0.89676	0.96320
6. Graphics	Mean	4.3182	4.2867	4.2692	4.2308	4.2517	4.1993
	N	286	286	286	286	286	286
	Std. Deviation	0.76788	0.80020	0.80409	0.83932	0.80758	0.84530
7. Variety of content types	Mean	4.3462	4.3531	4.3147	4.2972	4.2727	4.2483
	N	286	286	286	286	286	286
	Std. Deviation	0.75564	0.76624	0.75783	0.75333	0.77398	0.81083
8. Further readings	Mean	3.9825	3.9545	3.9580	3.9021	3.8881	3.8706
	N	286	286	286	286	286	286
	Std. Deviation	0.91558	0.90303	0.88555	0.91241	0.91464	0.91807
9. Learning activities	Mean	3.9755	3.9615	3.9476	3.8846	3.8811	3.8322
	N	286	286	286	286	286	286
	Std. Deviation	0.94559	0.95986	0.95185	0.97187	0.96238	0.98398
10. Micro-Quizzes	Mean	4.2098	4.2028	4.1678	4.1224	4.1154	4.0734
	N	286	286	286	286	286	286
	Std. Deviation	0.84897	0.85888	0.84177	0.88796	0.90067	0.94675
11. Assessment relevant to Learning Objectives	Mean	4.3392	4.3147	4.3112	4.2308	4.2343	4.1958
	N	286	286	286	286	286	286
	Std. Deviation	0.73533	0.78064	0.76618	0.83932	0.84874	0.88066

b) Overall learning experience

Table 144: Descriptive statistics of ratings per dimension

	N	Minimum	Maximum	Mean	Std. Deviation
PEoU	286	1.20	5.00	4.0112	.74090
LX	286	1.86	5.00	3.6174	.72005
CONF	286	1.50	5.00	3.9755	.74299
SAT	286	1.00	5.00	3.9056	.85522
INT	286	1.00	5.00	4.0682	.88342
Valid N (listwise)	286				

Overall learning experience per targeted group

Table 145: Overall learning experience per targeted group

Group		PEoU	LX	CONF	SAT	INT
eLearning Professional	Mean	3.7615	3.6593	4.1346	3.9615	4.1346
	N	26	26	26	26	26
	Std. Deviation	.93299	.76992	.74240	.93726	.91168
Higher Education Student	Mean	3.7158	3.4687	3.7281	3.4825	3.6404
	N	57	57	57	57	57
	Std. Deviation	.71108	.64724	.73235	.79037	.90512
School Teacher	Mean	4.1988	3.7221	4.0427	4.0671	4.2530
	N	164	164	164	164	164
	Std. Deviation	.63226	.71966	.71014	.80931	.78619
Other	Mean	3.8205	3.3663	3.9487	3.8077	3.8718
	N	39	39	39	39	39
	Std. Deviation	.84951	.71638	.83347	.88567	.99153
Total	Mean	4.0112	3.6174	3.9755	3.9056	4.0682
	N	286	286	286	286	286
	Std. Deviation	.74090	.72005	.74299	.85522	.88342

Statistical difference in Overall Learning Experience between all targeted groups

Table 146: ANOVA - Statistical difference in Overall Learning Experience between all targeted groups

		Sum of Squares	df	Mean Square	F	Sig.
PEoU	Between Groups	12.142	2	6.071	**12.854**	**.000**
	Within Groups	115.237	244	.472		
	Total	127.379	246			
LX	Between Groups	2.717	2	1.359	2.702	.069
	Within Groups	122.697	244	.503		
	Total	125.415	246			
CONF	Between Groups	4.884	2	2.442	**4.728**	**.010**
	Within Groups	126.015	244	.516		
	Total	130.899	246			
SAT	Between Groups	14.504	2	7.252	**10.809**	**.000**
	Within Groups	163.706	244	.671		
	Total	178.211	246			
INT	Between Groups	15.915	2	7.958	**11.599**	**.000**
	Within Groups	167.405	244	.686		
	Total	183.320	246			

Statistical difference in Overall Learning Experience for the pairs of targeted groups

Table 147: Independent Samples Test – eLearning Professionals – Higher education students

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PEoU	Equal variances assumed	2.393	.126	.246	81	.806	.04575	.18608	-.32449	.41598
	Equal variances not assumed			.222	38.788	.825	.04575	.20579	-.37058	.46207
LX	Equal variances assumed	.905	.344	1.172	81	.245	.19067	.16269	-.13303	.51436
	Equal variances not assumed			1.098	41.778	.278	.19067	.17363	-.15979	.54113
CONF	Equal variances assumed	**.307**	**.581**	**2.336**	81	**.022**	.40655	.17405	.06024	.75285
	Equal variances not assumed			2.324	47.906	**.024**	.40655	.17495	.05477	.75832
SAT	Equal variances assumed	**.675**	**.414**	**2.414**	81	**.018**	.47908	.19843	.08428	.87389
	Equal variances not assumed			2.265	41.882	**.029**	.47908	.21153	.05215	.90601
INT	Equal variances assumed	**.234**	**.630**	**2.302**	81	**.024**	.49426	.21468	.06712	.92141
	Equal variances not assumed			2.296	48.185	**.026**	.49426	.21527	.06148	.92705

Table 148: Independent Samples Test – eLearning Professionals – School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PEoU	Equal variances assumed	**5.922**	**.016**	**-3.046**	188	**.003**	-.43724	.14353	-.72038	-.15410
	Equal variances not assumed			-2.307	28.749	**.028**	-.43724	.18952	-.82500	-.04949
LX	Equal variances assumed	.047	.829	-.409	188	.683	-.06278	.15337	-.36532	.23975
	Equal variances not assumed			-.390	32.310	.699	-.06278	.16111	-.39084	.26527
CONF	Equal variances assumed	.916	.340	.610	188	.543	.09193	.15083	-.20560	.38946
	Equal variances not assumed			.590	32.674	.559	.09193	.15580	-.22516	.40903
SAT	Equal variances assumed	.622	.431	-.604	188	.546	-.10553	.17467	-.45010	.23903
	Equal variances not assumed			-.543	31.193	.591	-.10553	.19437	-.50186	.29079
INT	Equal variances assumed	2.199	.140	-.698	188	.486	-.11843	.16972	-.45323	.21636
	Equal variances not assumed			-.626	31.176	.536	-.11843	.18904	-.50390	.26703

Table 149: Independent Samples Test – eLearning Professionals – School Teachers

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PEoU	Equal variances assumed	**.126**	**.723**	**-4.808**	219	**.000**	-.48299	.10045	-.68097	-.28501
	Equal variances not assumed			-4.542	88.702	**.000**	-.48299	.10634	-.69430	-.27168
LX	Equal variances assumed	**1.379**	**.242**	**-2.349**	219	**.020**	-.25345	.10791	-.46614	-.04077
	Equal variances not assumed			-2.473	107.637	**.015**	-.25345	.10251	-.45665	-.05026
CONF	Equal variances assumed	**.251**	**.617**	**-2.858**	219	**.005**	-.31461	.11007	-.53155	-.09767
	Equal variances not assumed			-2.816	95.093	**.006**	-.31461	.11173	-.53643	-.09280
SAT	Equal variances assumed	**.039**	**.843**	**-4.726**	219	**.000**	-.58462	.12370	-.82841	-.34082
	Equal variances not assumed			-4.781	99.703	**.000**	-.58462	.12228	-.82723	-.34200
INT	Equal variances assumed	**1.259**	**.263**	**-4.870**	219	**.000**	-.61270	.12581	-.86065	-.36474
	Equal variances not assumed			-4.549	87.161	**.000**	-.61270	.13469	-.88040	-.34499

c) Correlation of overall learning experience with EDL competence advancement

Table 150: Correlations: Learning Experience – EDL competence advancement

		PEoU	LX	CONF	SAT	INT	EDL_adv
EDL_adv	Pearson Correlation	**.147***	.064	**.205****	**.198****	**.167****	1
	Sig. (2-tailed)	**.013**	.280	**.000**	**.001**	**.005**	
	N	**286**	286	**286**	**286**	**286**	286

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix C.2 – Evaluation of Gamification

C2.1 Overall Gamification Experience differences per Professional role

Table 151: ANOVA - Gamification Experience differences per Professional role					
OGX					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18,414	3	6,138	11,521	,000
Within Groups	148,113	278	,533		
Total	166,526	281			

Table 152: Multiple Comparisons - Gamification Experience differences per Professional role						
Dependent Variable: OGX						
Scheffe						
(I) ProfRole	(J) ProfRole	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
eLearning Professionals (IDs, eTutors)	HES	.01675	.16192	1,000	-,4387	,4722
	School Teacher	-.49834	.14224	,007	-,8984	-,0983
	Other	.10730	.22029	.971	-.5123	.7269
HES	eLearning Professionals (IDs. eTutors)	-.01675	.16192	1.000	-.4722	.4387
	School Teacher	-.51509	.10988	.000	-.8242	-.2060
	Other	.09055	.20092	.977	-.4746	.6557
School Teacher	eLearning Professionals (IDs. eTutors)	.49834	.14224	.007	.0983	.8984
	HES	.51509	.10988	.000	.2060	.8242
	Other	.60564	.18543	.015	.0841	1.1272
Other	eLearning Professionals (IDs. eTutors)	-.10730	.22029	.971	-.7269	.5123
	HES	-.09055	.20092	.977	-.6557	.4746
	School Teacher	-.60564	.18543	.015	-1.1272	-.0841

Overall Gamification Experience differences per MOOCs Completion

Table 153: ANOVA - Overall Gamification Experience differences per MOOCs Completion					
OGX					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.852	4	1.963	3.427	.009
Within Groups	158.674	277	.573		
Total	166.526	281			

Table 154: Multiple Comparisons - Overall Gamification Experience differences per MOOCs Completion						
Dependent Variable: OGX						
Scheffe						
(I) MOOCsCompl	(J) MOOCsCompl	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
0	1	-.20918	.14732	.733	-.6660	.2477
	2-4	-.09014	.11368	.960	-.4427	.2624

	5-10	-.14349	.14904	.920	-.6057	.3187
	>10	-.59235	.16397	.012	-1.1008	-.0839
1	0	.20918	.14732	.733	-.2477	.6660
	2-4	.11904	.15785	.966	-.3705	.6085
	5-10	.06568	.18495	.998	-.5079	.6392
	>10	-.38318	.19718	.439	-.9947	.2283
2-4	0	.09014	.11368	.960	-.2624	.4427
	1	-.11904	.15785	.966	-.6085	.3705
	5-10	-.05336	.15946	.998	-.5479	.4411
	>10	-.50222	.17349	.082	-1.0402	.0358
5-10	0	.14349	.14904	.920	-.3187	.6057
	1	-.06568	.18495	.998	-.6392	.5079
	2-4	.05336	.15946	.998	-.4411	.5479
	>10	-.44886	.19847	.279	-1.0643	.1666
>10	0	.59235	.16397	.012	.0839	1.1008
	1	.38318	.19718	.439	-.2283	.9947
	2-4	.50222	.17349	.082	-.0358	1.0402
	5-10	.44886	.19847	.279	-.1666	1.0643

Overall Gamification Experience per previous gamification experience

Dependent variable: OGX

Independent variable: GFamiliar (0.1)

Table 155: Independent Samples Test - Overall Gamification Experience per previous gamification experience

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
OGX	Equal variances assumed	3.368	.068	.901	280	.369	.08415	.09344	-.09979	.26810
	Equal variances not assumed			.941	273.030	.348	.08415	.08947	-.09199	.26029

Dependent variable: OGX

Independent variable: GLXP (0.1)

Table 156: Independent Samples Test - Overall Gamification Experience per previous gamification experience

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
OGX	Equal variances assumed	1.922	.167	.479	280	.632	.04398	.09185	-.13682	.22477
	Equal variances not assumed			.481	276.481	.631	.04398	.09141	-.13596	.22392

Dependent variable: OGX

Independent variable: GEdDesign (0.1)

Table 157: Independent Samples Test - Overall Gamification Experience per previous gamification experience										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
OGX	Equal variances assumed	.062	.804	3.405	280	.001	.30740	.09028	.12969	.48511
	Equal variances not assumed			3.392	268.802	.001	.30740	.09061	.12900	.48580

Table 158: Group Statistics - Overall Gamification Experience per previous gamification experience					
	GEdDesign	N	Mean	Std. Deviation	Std. Error Mean
OGX	Yes	130	3.9386	.77483	.06796
	No	152	3.6312	.73897	.05994

Dependent variable: OGX

Independent variable: GMOOCs (None. 1. 2-4. 5-10)

Table 159: ANOVA - Overall Gamification Experience per previous gamification experience					
OGX					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.152	3	2.051	3.554	.015
Within Groups	160.375	278	.577		
Total	166.526	281			

Table 160: Multiple Comparisons - Overall Gamification Experience per previous gamification experience						
Dependent Variable: OGX						
Scheffe						
(I) GMOOCs	(J) GMOOCs	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
None	1	-.27173	.12397	.189	-.6204	.0770
	2-4	.00382	.16095	1.000	-.4489	.4565
	5-10	-.74189	.29196	.094	-1.5631	.0793
1	None	.27173	.12397	.189	-.0770	.6204
	2-4	.27555	.18872	.546	-.2553	.8064
	5-10	-.47017	.30815	.508	-1.3369	.3966
2-4	None	-.00382	.16095	1.000	-.4565	.4489
	1	-.27555	.18872	.546	-.8064	.2553
	5-10	-.74571	.32479	.156	-1.6592	.1678
5-10	None	.74189	.29196	.094	-.0793	1.5631
	1	.47017	.30815	.508	-.3966	1.3369
	2-4	.74571	.32479	.156	-.1678	1.6592

Overall gamification experience relationship with attitude towards gamification

Table 161: Correlations - Overall gamification experience relationship with attitude towards gamification				
Spearman's rho		AGa	AGb	OGX
AGa	Correlation Coefficient	1.000	.258	.200
	Sig. (2-tailed)	.	.000	.001
	N	282	282	282
AGb	Correlation Coefficient	.258	1.000	.650
	Sig. (2-tailed)	.000	.	.000
	N	282	282	282
OGX	Correlation Coefficient	.200	.650	1.000
	Sig. (2-tailed)	.001	.000	.
	N	282	282	282

Gamification Experience per Element Correlation

Table 162: Correlations - Gamification Experience per Element Correlation						
		PNTGX	BDGGX	LVLGX	PBARGX	LBRDGX
PNTGX	Pearson Correlation	1	.891**	.887**	.658**	.769**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	282	282	282	282	282
BDGGX	Pearson Correlation	.891**	1	.909**	.641**	.811**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	282	282	282	282	282
LVLGX	Pearson Correlation	.887**	.909**	1	.667**	.807**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	282	282	282	282	282
PBARGX	Pearson Correlation	.658**	.641**	.667**	1	.657**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	282	282	282	282	282
LBRDGX	Pearson Correlation	.769**	.811**	.807**	.657**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	282	282	282	282	282

Overall Gamification Experience and Gamification Experience per Element Correlation

Table 163: Correlations - Overall Gamification Experience and Gamification Experience per Element							
		PNTGX	BDGGX	LVLGX	PBARGX	LBRDGX	OGX
PNTGX	Pearson Correlation	1	.891**	.887**	.658**	.769**	.881**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	282	282	282	282	282	282
BDGGX	Pearson Correlation	.891**	1	.909**	.641**	.811**	.810**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	282	282	282	282	282	282
LVLGX	Pearson Correlation	.887**	.909**	1	.667**	.807**	.805**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	282	282	282	282	282	282
PBARGX	Pearson Correlation	.658**	.641**	.667**	1	.657**	.655**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	282	282	282	282	282	282
LBRDGX	Pearson Correlation	.769**	.811**	.807**	.657**	1	.706**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	282	282	282	282	282	282

OGX	Pearson Correlation	.881**	.810**	.805**	.655**	.706**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	282	282	282	282	282	282

Gamification experience per element per previous gamification experience

Gamification experience per element differences – Gamification in educational design

Table 164: Independent Samples Test - Gamification experience per element differences – Gamification in educational design

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
PNTGX	Equal variances assumed	.219	.640	3.082	280	.002	.31574	.10244	.11408	.51740
	Equal variances not assumed			3.079	272.151	.002	.31574	.10255	.11385	.51763
BDGGX	Equal variances assumed	.249	.618	2.123	280	.035	.23450	.11048	.01704	.45197
	Equal variances not assumed			2.120	271.611	.035	.23450	.11064	.01669	.45232
LVLGX	Equal variances assumed	.027	.869	2.385	280	.018	.25695	.10776	.04483	.46907
	Equal variances not assumed			2.374	267.578	.018	.25695	.10826	.04381	.47010
PBARGX	Equal variances assumed	2.057	.153	2.296	280	.022	.21982	.09576	.03132	.40831
	Equal variances not assumed			2.308	277.919	.022	.21982	.09523	.03235	.40728
LBRDGX	Equal variances assumed	2.191	.140	1.660	280	.098	.18881	.11377	-.03514	.41275
	Equal variances not assumed			1.648	264.364	.100	.18881	.11454	-.03673	.41434

Gamification experience per element and attitude towards gamification relationship

Table 165: Correlations - Gamification experience per element and attitude towards gamification

Spearman's rho		PNTGX	BDGGX	LVLGX	PBARGX	LBRDGX	AGa	AGb
AGa	Correlation Coefficient	.135	.142	.149	.117	.056	1.000	.258
	Sig. (2-tailed)	.023	.017	.012	.049	.345	.	.000
	N	282	282	282	282	282	282	282
AGb	Correlation Coefficient	.601	.507	.541	.458	.363	.258	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.
	N	282	282	282	282	282	282	282

C2.2 Overall Gamification Experience and EDL Advancement and Achieved EDL per professional groups

Table 166: ANOVA - Overall Gamification Experience and EDL Advancement and Achieved EDL per professional groups

		Sum of Squares	df	Mean Square	F	Sig.
AchEDL	Between Groups	23.931	3	7.977	13.396	.000
	Within Groups	165.546	278	.595		
	Total	189.477	281			
EDLadv	Between Groups	9.908	3	3.303	4.367	.005
	Within Groups	210.262	278	.756		
	Total	220.171	281			

Table 167: Multiple Comparisons - Overall Gamification Experience and EDL Advancement and Achieved EDL per professional groups

Dependent Variable: OGX

Scheffe

	(I) ProfRoles	(J) ProfRoles	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
AchEDL	eLearning Professionals (ID+eTut)	HES	.71286	.17118	.001	.2314	1.1943
		School Teachers	-.01015	.15037	1.000	-.4331	.4128
		Others	.09345	.23289	.984	-.5616	.7485
	HES	eLearning Professionals (ID+eTut)	-.71286	.17118	.001	-1.1943	-.2314
		School Teachers	-.72301	.11617	.000	-1.0498	-.3963
		Others	-.61941	.21242	.039	-1.2169	-.0219
	School Teachers	eLearning Professionals (ID+eTut)	.01015	.15037	1.000	-.4128	.4331
		HES	.72301	.11617	.000	.3963	1.0498
		Others	.10360	.19604	.964	-.4478	.6550
	Others	eLearning Professionals (ID+eTut)	-.09345	.23289	.984	-.7485	.5616
		HES	.61941	.21242	.039	.0219	1.2169
		School Teachers	-.10360	.19604	.964	-.6550	.4478
EDLadv	eLearning Professionals (ID+eTut)	HES	.483377	.192918	.101	-.05924	1.02600
		School Teachers	.039160	.169470	.997	-.43751	.51583
		Others	.323371	.262466	.678	-.41487	1.06161
	HES	eLearning Professionals (ID+eTut)	-.483377	.192918	.101	-1.02600	.05924
		School Teachers	-.444217	.130925	.010	-.81247	-.07597
		Others	-.160006	.239395	.930	-.83335	.51334
	School Teachers	eLearning Professionals (ID+eTut)	-.039160	.169470	.997	-.51583	.43751
		HES	.444217	.130925	.010	.07597	.81247
		Others	.284211	.220935	.647	-.33721	.90563
	Others	eLearning Professionals (ID+eTut)	-.323371	.262466	.678	-1.06161	.41487
		HES	.160006	.239395	.930	-.51334	.83335
		School Teachers	-.284211	.220935	.647	-.90563	.33721

EDL Advancement and overall gamification experience correlations

Table 168: Correlations - EDL Advancement and overall gamification experience		
		EDLadv
OGX	Pearson Correlation	.146*
	Sig. (2-tailed)	.014
	N	282

Achieved EDL and overall gamification experience correlations

Table 169: Correlations - Achieved EDL and overall gamification experience					
			IntEDL	AchEDL	OGX
	IntEDL	Pearson Correlation	1	.443	.116
		Sig. (2-tailed)		.000	.051
		N	282	282	282
	AchEDL	Pearson Correlation	.443	1	.278
		Sig. (2-tailed)	.000		.000
		N	282	282	282
	OGX	Pearson Correlation	.116	.278	1
		Sig. (2-tailed)	.051	.000	
		N	282	282	282

EDL Advancement and overall gamification experience' items correlations

Table 170: Correlations - EDL Advancement and overall gamification experience' items		
		EDLadv
SATG	Pearson Correlation	.149*
	Sig. (2-tailed)	.012
	N	282
ENJ	Pearson Correlation	.176**
	Sig. (2-tailed)	.003
	N	282
MOT	Pearson Correlation	.168**
	Sig. (2-tailed)	.005
	N	282
COMPTENCE	Pearson Correlation	.169**
	Sig. (2-tailed)	.004
	N	282
AUT	Pearson Correlation	.219**
	Sig. (2-tailed)	.000
	N	282
ACCMPL	Pearson Correlation	.158**
	Sig. (2-tailed)	.008
	N	282
GUID	Pearson Correlation	.091
	Sig. (2-tailed)	.127
	N	282
SCLXP	Pearson Correlation	.079
	Sig. (2-tailed)	.187
	N	282
CMPTITION	Pearson Correlation	-.004
	Sig. (2-tailed)	.947
	N	282
CHLLNG	Pearson Correlation	.091
	Sig. (2-tailed)	.127
	N	282
USFL	Pearson Correlation	.144*
	Sig. (2-tailed)	.015
	N	282

Achieved EDL and overall gamification experience' items correlations

Table 171: Correlations - Achieved EDL and overall gamification experience' items			IntEDL	AchEDL
	SATG	Pearson Correlation	.058	.221
		Sig. (2-tailed)	.333	.000
		N	282	282
	ENJ	Pearson Correlation	.015	.206
		Sig. (2-tailed)	.802	.001
		N	282	282
	MOT	Pearson Correlation	.077	.262
		Sig. (2-tailed)	.195	.000
		N	282	282
	COMPTENCE	Pearson Correlation	.190	.380
		Sig. (2-tailed)	.001	.000
		N	282	282
	AUT	Pearson Correlation	.064	.303
		Sig. (2-tailed)	.282	.000
		N	282	282
	ACCMPL	Pearson Correlation	.075	.248
		Sig. (2-tailed)	.212	.000
		N	282	282
	GUID	Pearson Correlation	.109	.212
		Sig. (2-tailed)	.067	.000
		N	282	282
	SCLXP	Pearson Correlation	.136	.226
		Sig. (2-tailed)	.023	.000
		N	282	282
	CMPTITION	Pearson Correlation	.181	.184
		Sig. (2-tailed)	.002	.002
		N	282	282
	CHLLNG	Pearson Correlation	.136	.239
		Sig. (2-tailed)	.022	.000
		N	282	282
	USFL	Pearson Correlation	.022	.179
		Sig. (2-tailed)	.707	.003
		N	282	282

C.2.3. Engagement

Engagement (total number of Points) and overall gamification experience correlation

Table 172: Correlations			
		POINTSadd	OGX
POINTSadd	Pearson Correlation	1	.138*
	Sig. (2-tailed)		.020
	N	282	282
OGX	Pearson Correlation	.138*	1
	Sig. (2-tailed)	.020	
	N	282	282

Engagement and gamification experience per element correlation

Table 173: Correlations - Engagement and gamification experience per element							
		POINTSadd	PNTGX	BDGGX	LVLGX	PBARGX	LBRDGX
POINTSadd	Pearson Correlation	1	.123*	.075	.112	.162**	-.036
	Sig. (2-tailed)		.039	.211	.061	.006	.548
	N	282	282	282	282	282	282
PNTGX	Pearson Correlation	.123*	1	.891**	.887**	.658**	.769**
	Sig. (2-tailed)	.039		.000	.000	.000	.000
	N	282	282	282	282	282	282
BDGGX	Pearson Correlation	.075	.891**	1	.909**	.641**	.811**
	Sig. (2-tailed)	.211	.000		.000	.000	.000
	N	282	282	282	282	282	282
LVLGX	Pearson Correlation	.112	.887**	.909**	1	.667**	.807**
	Sig. (2-tailed)	.061	.000	.000		.000	.000
	N	282	282	282	282	282	282
PBARGX	Pearson Correlation	.162**	.658**	.641**	.667**	1	.657**
	Sig. (2-tailed)	.006	.000	.000	.000		.000
	N	282	282	282	282	282	282
LBRDGX	Pearson Correlation	-.036	.769**	.811**	.807**	.657**	1
	Sig. (2-tailed)	.548	.000	.000	.000	.000	
	N	282	282	282	282	282	282

Engagement per previous gamification experience

Table 174: Independent Samples Test: Engagement per previous gamification experience										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
POINTSadd	Equal variances assumed	3.185	.075	2.284	280	.023	1057.54543	463.05265	146.03902	1969.05184
	Equal variances not assumed			2.258	233.076	.025	1057.54543	468.30673	134.89019	1980.20066

Table 175: Group Statistics - Engagement per previous gamification experience					
	GFamiliar	N	Mean	Std. Deviation	Std. Error Mean
POINTSadd	Yes	168	7260.0893	3723.47123	287.27204
	No	114	6202.5439	3948.87329	369.84587

Table 176: Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
POINTSadd	Equal variances assumed	9.169	.003	2.965	280	.003	1343.26447	453.04254	451.46270	2235.06625
	Equal variances not assumed			2.990	279.342	.003	1343.26447	449.22955	458.95942	2227.56953

Table 177: Group Statistics					
	GEdDesign	N	Mean	Std. Deviation	Std. Error Mean
POINTSadd	Yes	130	7556.6000	3566.70553	312.82077
	No	152	6213.3355	3974.97847	322.41333

Appendix D – Comparison of Learning experience in Phases A and B

D.1. Learning Experience per Module

Group Statistics

	Phase A=1 B=2	N	Mean	Std. Deviation	Std. Error Mean
1. Learning objectives per module were clearly stated. [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase B	286	4.35	.698	.041
	Phase A	235	4.34	.764	.050
1. Learning objectives per module were clearly stated. [Module 3 Learning Analytics]	Phase B	286	4.33	.734	.043
	Phase A	235	4.29	.770	.050
1. Learning objectives per module were clearly stated. [Module 4 Teaching Analytics]	Phase B	286	4.30	.754	.045
	Phase A	235	4.23	.796	.052
1. Learning objectives per module were clearly stated. [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	4.29	.762	.045
	Phase A	235	4.18	.873	.057
1. Learning objectives per module were clearly stated. [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	4.28	.761	.045
	Phase A	235	3.99	.947	.062
1. Learning objectives per module were clearly stated. [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase B	286	4.24	.783	.046
	Phase A	235	4.03	.976	.064
2. The content per module was presented in a comprehensible manner. [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase B	286	4.21	.771	.046
	Phase A	235	4.17	.813	.053
2. The content per module was presented in a comprehensible manner. [Module 3 Learning Analytics]	Phase B	286	4.18	.778	.046
	Phase A	235	4.15	.797	.052
2. The content per module was presented in a comprehensible manner. [Module 4 Teaching Analytics]	Phase B	286	4.15	.766	.045
	Phase A	235	4.07	.795	.052
2. The content per module was presented in a comprehensible manner. [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	4.13	.802	.047
	Phase A	235	4.00	.860	.056
2. The content per module was presented in a comprehensible manner. [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	4.12	.796	.047
	Phase A	235	3.66	.997	.065
2. The content per module was presented in a comprehensible manner. [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase B	286	4.03	.862	.051
	Phase A	235	3.70	.981	.064
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase B	286	4.37	.727	.043
	Phase A	235	4.22	.800	.052
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 3 Learning Analytics]	Phase B	286	4.28	.781	.046
	Phase A	235	4.21	.788	.051
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 4 Teaching Analytics]	Phase B	286	4.27	.783	.046
	Phase A	235	4.14	.826	.054
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	4.27	.776	.046
	Phase A	235	4.08	.883	.058
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	4.22	.790	.047
	Phase A	235	3.84	1.021	.067
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase B	286	4.22	.796	.047
	Phase A	235	3.89	.995	.065
4. The educational materials and content per	Phase B	286	4.31	.749	.044

module were based on current up-to-date information. [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase A	235	4.27	.822	.054
4. The educational materials and content per module were based on current up-to-date information. [Module 3 Learning Analytics]	Phase B	286	4.31	.783	.046
	Phase A	235	4.23	.835	.054
4. The educational materials and content per module were based on current up-to-date information. [Module 4 Teaching Analytics]	Phase B	286	4.30	.763	.045
	Phase A	235	4.22	.842	.055
4. The educational materials and content per module were based on current up-to-date information. [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	4.27	.808	.048
	Phase A	235	4.13	.936	.061
4. The educational materials and content per module were based on current up-to-date information. [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	4.28	.786	.046
	Phase A	235	4.11	.888	.058
4. The educational materials and content per module were based on current up-to-date information. [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase B	286	4.26	.827	.049
	Phase A	235	4.12	.890	.058
5. The instructional videos per module supported my learning and added value to the course content. [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase B	286	4.22	.896	.053
	Phase A	235	4.04	.886	.058
5. The instructional videos per module supported my learning and added value to the course content. [Module 3 Learning Analytics]	Phase B	286	4.20	.870	.051
	Phase A	235	4.03	.891	.058
5. The instructional videos per module supported my learning and added value to the course content. [Module 4 Teaching Analytics]	Phase B	286	4.19	.830	.049
	Phase A	235	4.00	.903	.059
5. The instructional videos per module supported my learning and added value to the course content. [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	4.12	.898	.053
	Phase A	235	3.90	.976	.064
5. The instructional videos per module supported my learning and added value to the course content. [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	4.12	.897	.053
	Phase A	235	3.58	1.150	.075
5. The instructional videos per module supported my learning and added value to the course content. [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase B	286	4.05	.963	.057
	Phase A	235	3.67	1.021	.067
6. The graphics per module supported my learning and added value to the course content. [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase B	286	4.32	.768	.045
	Phase A	235	4.20	.855	.056
6. The graphics per module supported my learning and added value to the course content. [Module 3 Learning Analytics]	Phase B	286	4.29	.800	.047
	Phase A	235	4.18	.864	.056
6. The graphics per module supported my learning and added value to the course content. [Module 4 Teaching Analytics]	Phase B	286	4.27	.804	.048
	Phase A	235	4.17	.835	.054
6. The graphics per module supported my learning and added value to the course content. [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	4.23	.839	.050
	Phase A	235	4.11	.860	.056
6. The graphics per module supported my learning and added value to the course content. [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	4.25	.808	.048
	Phase A	235	4.01	.915	.060
6. The graphics per module supported my learning and added value to the course content. [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase B	286	4.20	.845	.050
	Phase A	235	4.02	.924	.060
7. There was a good variety of content types (i.e..	Phase B	286	4.35	.756	.045

written notes. videos. graphics. etc.). [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase A	235	4.23	.865	.056
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 3 Learning Analytics]	Phase B	286	4.35	.766	.045
	Phase A	235	4.22	.872	.057
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 4 Teaching Analytics]	Phase B	286	4.31	.758	.045
	Phase A	235	4.17	.865	.056
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	4.30	.753	.045
	Phase A	235	4.14	.897	.059
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	4.27	.774	.046
	Phase A	235	4.01	.976	.064
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase B	286	4.25	.811	.048
	Phase A	235	4.03	.987	.064
8. Further Readings per module were relevant and supported my learning. [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase B	286	3.98	.914	.054
	Phase A	235	3.83	.920	.060
8. Further Readings per module were relevant and supported my learning. [Module 3 Learning Analytics]	Phase B	286	3.95	.901	.053
	Phase A	235	3.80	.951	.062
8. Further Readings per module were relevant and supported my learning. [Module 4 Teaching Analytics]	Phase B	286	3.95	.883	.052
	Phase A	235	3.77	.934	.061
8. Further Readings per module were relevant and supported my learning. [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	3.90	.910	.054
	Phase A	235	3.74	.954	.062
8. Further Readings per module were relevant and supported my learning. [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	3.88	.912	.054
	Phase A	235	3.66	.992	.065
8. Further Readings per module were relevant and supported my learning. [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase B	286	3.87	.916	.054
	Phase A	235	3.67	.983	.064
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/solutions. [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase B	286	3.98	.946	.056
	Phase A	235	3.69	.978	.064
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/solutions. [Module 3 Learning Analytics]	Phase B	286	3.96	.960	.057
	Phase A	235	3.69	.967	.063
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/solutions. [Module 4 Teaching Analytics]	Phase B	286	3.95	.952	.056
	Phase A	235	3.65	.955	.062
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/solutions. [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	3.88	.972	.057
	Phase A	235	3.63	.984	.064
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/solutions. [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	3.88	.962	.057
	Phase A	235	3.57	1.003	.065
9. Learning activities (Polls. Discussions and	Phase B	286	3.83	.984	.058

Workshops) used in the module were effective and helped me construct explanations/solutions. [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase A	235	3.61	.995	.065
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase B	286	4.21	.849	.050
	Phase A	235	4.05	.843	.055
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 3 Learning Analytics]	Phase B	286	4.20	.859	.051
	Phase A	235	3.99	.850	.055
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 4 Teaching Analytics]	Phase B	286	4.17	.842	.050
	Phase A	235	3.96	.888	.058
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	4.12	.888	.053
	Phase A	235	3.94	.916	.060
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	4.12	.901	.053
	Phase A	235	3.80	1.012	.066
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase B	286	4.07	.947	.056
	Phase A	235	3.84	.982	.064
11. The assessments per module were relevant to the learning objectives. [Module 2 Online and Blended Teaching and Learning supported by Educational Data]	Phase B	286	4.34	.735	.043
	Phase A	235	4.16	.811	.053
11. The assessments per module were relevant to the learning objectives. [Module 3 Learning Analytics]	Phase B	286	4.31	.781	.046
	Phase A	235	4.11	.852	.056
11. The assessments per module were relevant to the learning objectives. [Module 4 Teaching Analytics]	Phase B	286	4.31	.766	.045
	Phase A	235	4.09	.878	.057
11. The assessments per module were relevant to the learning objectives. [Module 5 Applying Teaching & Learning Analytics with Moodle]	Phase B	286	4.23	.839	.050
	Phase A	235	4.02	.936	.061
11. The assessments per module were relevant to the learning objectives. [Module 6 Applying Teaching & Learning Analytics with eXact Suite]	Phase B	286	4.23	.849	.050
	Phase A	235	3.88	.949	.062
11. The assessments per module were relevant to the learning objectives. [Module 7 Applying Teaching & Learning Analytics with IMC Learning Suite]	Phase B	286	4.20	.881	.052
	Phase A	235	3.95	.918	.060

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
1. Learning objectives per module were clearly stated. [Module 2]	Equal variances assumed	.531	.467	.210	519	.834	.013	.064	-.113	.139
	Equal variances not assumed			.208	480.047	.835	.013	.065	-.114	.141
1. Learning objectives per module were clearly stated. [Module 3]	Equal variances assumed	.045	.832	.584	519	.560	.039	.066	-.091	.168
	Equal variances not assumed			.581	489.648	.562	.039	.066	-.092	.169
1. Learning objectives per module were clearly stated. [Module 4]	Equal variances assumed	.007	.935	.979	519	.328	.067	.068	-.067	.200
	Equal variances not assumed			.974	488.489	.331	.067	.068	-.068	.201
1. Learning objectives per module were clearly stated. [Module 5]	Equal variances assumed	.389	.533	1.605	519	.109	.115	.072	-.026	.256
	Equal variances not assumed			1.583	467.829	.114	.115	.073	-.028	.258
1. Learning objectives per module were clearly stated. [Module 6]	Equal variances assumed	.811	.368	3.804	519	.000	.285	.075	.138	.432
	Equal variances not assumed			3.724	445.297	.000	.285	.076	.134	.435
1. Learning objectives per module were clearly stated. [Module 7]	Equal variances assumed	1.133	.288	2.789	519	.005	.215	.077	.064	.366
	Equal variances not assumed			2.731	444.984	.007	.215	.079	.060	.370
2. The content per module was presented in a comprehensible manner. [Module 2]	Equal variances assumed	.119	.731	.630	519	.529	.044	.070	-.093	.180
	Equal variances not assumed			.627	488.667	.531	.044	.070	-.094	.181
2. The content per module was presented in a comprehensible manner. [Module 3]	Equal variances assumed	.229	.632	.413	519	.679	.029	.069	-.107	.165
	Equal variances not assumed			.412	494.950	.680	.029	.069	-.108	.165
2. The content per module was presented in a comprehensible manner. [Module 4]	Equal variances assumed	.173	.678	1.188	519	.235	.082	.069	-.053	.216
	Equal variances not assumed			1.184	492.163	.237	.082	.069	-.054	.217
2. The content per module was presented in a comprehensible manner. [Module 5]	Equal variances assumed	.163	.687	1.667	519	.096	.122	.073	-.022	.265
	Equal variances not assumed			1.656	484.848	.098	.122	.073	-.023	.266
2. The content per module was presented in a comprehensible manner. [Module 6]	Equal variances assumed	18.897	.000	5.889	519	.000	.463	.079	.308	.617
	Equal variances not assumed			5.763	443.441	.000	.463	.080	.305	.621
2. The content per module was presented in a comprehensible manner. [Module 7]	Equal variances assumed	15.736	.000	4.121	519	.000	.333	.081	.174	.492
	Equal variances not assumed			4.069	469.782	.000	.333	.082	.172	.494
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 2]	Equal variances assumed	.115	.735	2.241	519	.025	.150	.067	.019	.282
	Equal variances not assumed			2.220	478.147	.027	.150	.068	.017	.283
3. The educational materials and content per module were	Equal variances assumed	.109	.742	1.020	519	.308	.070	.069	-.065	.206

relevant and addressed the topic identified in the title. [Module 3]	Equal variances not assumed			1.019	497.959	.309	.070	.069	-.065	.206
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 4]	Equal variances assumed	.000	.988	1.932	519	.054	.137	.071	-.002	.275
	Equal variances not assumed			1.922	488.478	.055	.137	.071	-.003	.276
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 5]	Equal variances assumed	.000	.992	2.600	519	.010	.189	.073	.046	.332
	Equal variances not assumed			2.567	469.883	.011	.189	.074	.044	.334
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 6]	Equal variances assumed	9.199	.003	4.858	519	.000	.385	.079	.230	.541
	Equal variances not assumed			4.740	434.408	.000	.385	.081	.226	.545
3. The educational materials and content per module were relevant and addressed the topic identified in the title. [Module 7]	Equal variances assumed	5.370	.021	4.226	519	.000	.332	.078	.177	.486
	Equal variances not assumed			4.136	443.847	.000	.332	.080	.174	.489
4. The educational materials and content per module were based on current up-to-date information. [Module 2]	Equal variances assumed	1.648	.200	.676	519	.499	.047	.069	-.089	.182
	Equal variances not assumed			.670	478.943	.503	.047	.070	-.090	.183
4. The educational materials and content per module were based on current up-to-date information. [Module 3]	Equal variances assumed	.277	.599	1.156	519	.248	.082	.071	-.057	.222
	Equal variances not assumed			1.149	486.193	.251	.082	.071	-.058	.223
4. The educational materials and content per module were based on current up-to-date information. [Module 4]	Equal variances assumed	.925	.337	1.139	519	.255	.080	.070	-.058	.218
	Equal variances not assumed			1.128	477.569	.260	.080	.071	-.059	.220
4. The educational materials and content per module were based on current up-to-date information. [Module 5]	Equal variances assumed	1.956	.163	1.796	519	.073	.137	.076	-.013	.287
	Equal variances not assumed			1.771	465.325	.077	.137	.078	-.015	.290
4. The educational materials and content per module were based on current up-to-date information. [Module 6]	Equal variances assumed	.561	.454	2.410	519	.016	.177	.073	.033	.321
	Equal variances not assumed			2.382	471.855	.018	.177	.074	.031	.323
4. The educational materials and content per module were based on current up-to-date information. [Module 7]	Equal variances assumed	.373	.542	1.796	519	.073	.135	.075	-.013	.283
	Equal variances not assumed			1.783	483.766	.075	.135	.076	-.014	.284
5. The instructional videos per module supported my learning and added value to the course content. [Module 2]	Equal variances assumed	2.468	.117	2.221	519	.027	.174	.078	.020	.328
	Equal variances not assumed			2.223	501.619	.027	.174	.078	.020	.328
5. The instructional videos per module supported my learning and added value to the course content. [Module 3]	Equal variances assumed	1.660	.198	2.134	519	.033	.165	.077	.013	.317
	Equal variances not assumed			2.129	494.862	.034	.165	.078	.013	.318
5. The instructional videos per module supported my learning and added value to the course content. [Module 4]	Equal variances assumed	.242	.623	2.584	519	.010	.197	.076	.047	.346
	Equal variances not assumed			2.563	481.171	.011	.197	.077	.046	.347
5. The instructional videos per module supported my learning and added value to the course content. [Module 5]	Equal variances assumed	.149	.700	2.636	519	.009	.217	.082	.055	.378
	Equal variances not assumed			2.615	481.636	.009	.217	.083	.054	.380

5. The instructional videos per module supported my learning and added value to the course content. [Module 6]	Equal variances assumed	27.070	.000	5.984	519	.000	.537	.090	.360	.713
	Equal variances not assumed			5.843	436.812	.000	.537	.092	.356	.717
5. The instructional videos per module supported my learning and added value to the course content. [Module 7]	Equal variances assumed	4.219	.040	4.283	519	.000	.373	.087	.202	.544
	Equal variances not assumed			4.258	487.454	.000	.373	.088	.201	.545
6. The graphics per module supported my learning and added value to the course content. [Module 2]	Equal variances assumed	.584	.445	1.721	519	.086	.122	.071	-.017	.262
	Equal variances not assumed			1.703	475.523	.089	.122	.072	-.019	.264
6. The graphics per module supported my learning and added value to the course content. [Module 3]	Equal variances assumed	.083	.773	1.479	519	.140	.108	.073	-.035	.251
	Equal variances not assumed			1.468	483.193	.143	.108	.074	-.037	.253
6. The graphics per module supported my learning and added value to the course content. [Module 4]	Equal variances assumed	.091	.763	1.374	519	.170	.099	.072	-.043	.241
	Equal variances not assumed			1.369	491.922	.171	.099	.072	-.043	.241
6. The graphics per module supported my learning and added value to the course content. [Module 5]	Equal variances assumed	.251	.617	1.608	519	.109	.120	.075	-.027	.267
	Equal variances not assumed			1.604	494.741	.109	.120	.075	-.027	.267
6. The graphics per module supported my learning and added value to the course content. [Module 6]	Equal variances assumed	.059	.808	3.221	519	.001	.243	.076	.095	.392
	Equal variances not assumed			3.182	470.944	.002	.243	.076	.093	.393
6. The graphics per module supported my learning and added value to the course content. [Module 7]	Equal variances assumed	.051	.822	2.348	519	.019	.182	.078	.030	.335
	Equal variances not assumed			2.327	479.992	.020	.182	.078	.028	.336
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 2]	Equal variances assumed	3.951	.047	1.698	519	.090	.121	.071	-.019	.260
	Equal variances not assumed			1.676	468.315	.094	.121	.072	-.021	.262
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 3]	Equal variances assumed	2.030	.155	1.896	519	.059	.136	.072	-.005	.277
	Equal variances not assumed			1.872	469.836	.062	.136	.073	-.007	.279
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 4]	Equal variances assumed	1.891	.170	2.031	519	.043	.144	.071	.005	.284
	Equal variances not assumed			2.005	468.973	.046	.144	.072	.003	.286
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 5]	Equal variances assumed	2.356	.125	2.168	519	.031	.157	.072	.015	.299
	Equal variances not assumed			2.132	457.558	.034	.157	.074	.012	.301
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 6]	Equal variances assumed	3.982	.047	3.390	519	.001	.260	.077	.109	.411
	Equal variances not assumed			3.315	441.478	.001	.260	.078	.106	.414
7. There was a good variety of content types (i.e.. written notes. videos. graphics. etc.). [Module 7]	Equal variances assumed	3.006	.084	2.828	519	.005	.223	.079	.068	.377
	Equal variances not assumed			2.775	451.555	.006	.223	.080	.065	.380
8. Further Readings per module were relevant and supported my learning. [Module 2]	Equal variances assumed	.060	.807	1.903	519	.058	.153	.081	-.005	.312
	Equal variances not assumed			1.901	498.355	.058	.153	.081	-.005	.312
8. Further Readings per module were relevant and supported my learning. [Module 3]	Equal variances assumed	1.435	.232	1.857	519	.064	.151	.081	-.009	.311
	Equal variances not assumed			1.847	488.342	.065	.151	.082	-.010	.312

8. Further Readings per module were relevant and supported my learning. [Module 4]	Equal variances assumed	1.977	.160	2.363	519	.019	.189	.080	.032	.345
	Equal variances not assumed			2.350	487.967	.019	.189	.080	.031	.346
8. Further Readings per module were relevant and supported my learning. [Module 5]	Equal variances assumed	.180	.672	1.931	519	.054	.158	.082	-.003	.319
	Equal variances not assumed			1.922	489.791	.055	.158	.082	-.004	.320
8. Further Readings per module were relevant and supported my learning. [Module 6]	Equal variances assumed	2.871	.091	2.642	519	.008	.221	.084	.057	.385
	Equal variances not assumed			2.620	481.274	.009	.221	.084	.055	.386
8. Further Readings per module were relevant and supported my learning. [Module 7]	Equal variances assumed	1.007	.316	2.388	519	.017	.199	.083	.035	.363
	Equal variances not assumed			2.372	484.431	.018	.199	.084	.034	.364
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/ solutions. [Module 2]	Equal variances assumed	4.388	.037	3.334	519	.001	.282	.085	.116	.448
	Equal variances not assumed			3.323	492.752	.001	.282	.085	.115	.449
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/ solutions. [Module 3]	Equal variances assumed	2.516	.113	3.260	519	.001	.276	.085	.110	.443
	Equal variances not assumed			3.258	498.220	.001	.276	.085	.110	.443
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/ solutions. [Module 4]	Equal variances assumed	2.092	.149	3.533	519	.000	.296	.084	.132	.461
	Equal variances not assumed			3.532	498.974	.000	.296	.084	.132	.461
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/ solutions. [Module 5]	Equal variances assumed	.957	.328	2.912	519	.004	.251	.086	.082	.420
	Equal variances not assumed			2.909	497.211	.004	.251	.086	.081	.420
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/ solutions. [Module 6]	Equal variances assumed	3.327	.069	3.599	519	.000	.311	.086	.141	.481
	Equal variances not assumed			3.585	491.077	.000	.311	.087	.140	.481
9. Learning activities (Polls. Discussions and Workshops) used in the module were effective and helped me construct explanations/ solutions. [Module 7]	Equal variances assumed	.620	.431	2.520	519	.012	.219	.087	.048	.390
	Equal variances not assumed			2.517	497.401	.012	.219	.087	.048	.391
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 2]	Equal variances assumed	3.230	.073	2.187	519	.029	.163	.075	.017	.309
	Equal variances not assumed			2.188	500.795	.029	.163	.074	.017	.309
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 3]	Equal variances assumed	4.133	.043	2.864	519	.004	.216	.075	.068	.363
	Equal variances not assumed			2.867	501.564	.004	.216	.075	.068	.363
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 4]	Equal variances assumed	.038	.846	2.713	519	.007	.206	.076	.057	.355
	Equal variances not assumed			2.698	488.389	.007	.206	.076	.056	.356
10. Assessment tasks used per module challenged my	Equal variances assumed	.001	.975	2.241	519	.025	.178	.079	.022	.333

thinking and supported my learning [Module 5]	Equal variances not assumed			2.234	493.397	.026	.178	.080	.021	.334
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 6]	Equal variances assumed	4.465	.035	3.761	519	.000	.315	.084	.151	.480
	Equal variances not assumed			3.719	473.180	.000	.315	.085	.149	.482
10. Assessment tasks used per module challenged my thinking and supported my learning [Module 7]	Equal variances assumed	1.026	.312	2.773	519	.006	.235	.085	.069	.402
	Equal variances not assumed			2.763	492.104	.006	.235	.085	.068	.402
11. The assessments per module were relevant to the learning objectives.[Module 2]	Equal variances assumed	.006	.937	2.617	519	.009	.177	.068	.044	.311
	Equal variances not assumed			2.592	477.915	.010	.177	.068	.043	.312
11. The assessments per module were relevant to the learning objectives.[Module 3]	Equal variances assumed	.143	.705	2.789	519	.005	.200	.072	.059	.341
	Equal variances not assumed			2.765	480.437	.006	.200	.072	.058	.342
11. The assessments per module were relevant to the learning objectives.[Module 4]	Equal variances assumed	.039	.844	3.138	519	.002	.226	.072	.085	.368
	Equal variances not assumed			3.096	468.071	.002	.226	.073	.083	.370
11. The assessments per module were relevant to the learning objectives [Module 5]	Equal variances assumed	.242	.623	2.691	519	.007	.209	.078	.057	.362
	Equal variances not assumed			2.663	475.150	.008	.209	.079	.055	.364
11. The assessments per module were relevant to the learning objectives.[Module 6]	Equal variances assumed	.429	.513	4.484	519	.000	.353	.079	.199	.508
	Equal variances not assumed			4.435	474.457	.000	.353	.080	.197	.510
11. The assessments per module were relevant to the learning objectives/[Module 7]	Equal variances assumed	.193	.661	3.123	519	.002	.247	.079	.092	.402
	Equal variances not assumed			3.110	491.018	.002	.247	.079	.091	.403

D.2 Overall Learning Experience comparison

Group Statistics

	Phase	N	Mean	Std. Deviation	Std. Error Mean
1. The course platform was easy to use.	Phase B	286	3.98	.982	.058
	Phase A	235	4.17	1.015	.066
2. The overall visual design of the course was appealing.	Phase B	286	4.05	.922	.055
	Phase A	235	4.14	.959	.063
3. The course environment was well structured. topics and subtopics were logically arranged in a predictable pattern.	Phase B	286	4.22	.826	.049
	Phase A	235	4.11	.920	.060
4. The learning path was easy to navigate.	Phase B	286	3.92	1.056	.062
	Phase A	235	4.00	1.080	.070
5. Course objectives and learning goals were clearly stated.	Phase B	286	4.40	.750	.044
	Phase A	235	4.34	.804	.052
6. The workload was reasonably spread.	Phase B	286	3.64	1.012	.060
	Phase A	235	3.75	1.046	.068
7. The workload was in line with my expectations.	Phase B	286	3.39	1.155	.068
	Phase A	235	3.57	1.081	.071
8. The course difficulty was in line with my expectations at the start of the course.	Phase B	286	3.34	1.143	.068
	Phase A	235	3.52	1.075	.070
9. The difficulty level of	Phase B	286	3.80	.893	.053

assessments was appropriate for the course.	Phase A	235	3.81	.947	.062
10. The level of interaction with peer learners was adequate.	Phase B	286	3.46	.986	.058
	Phase A	235	3.36	.947	.062
11. The discussion forums were an effective tool for collaborating with other learners.	Phase B	286	3.27	1.120	.066
	Phase A	235	3.23	1.054	.069
12. Help and support provided on the course platform were adequate.	Phase B	286	3.90	.898	.053
	Phase A	235	3.54	1.005	.066
13. I can apply the knowledge created in this course to my work or other related activities.	Phase B	286	3.92	.869	.051
	Phase A	235	3.93	.874	.057
14. I was motivated to work through the course.	Phase B	286	3.95	.915	.054
	Phase A	235	3.72	1.044	.068
15. I feel like I achieved my personal goals for this course.	Phase B	286	4.03	.820	.049
	Phase A	235	3.86	.941	.061
16. I enjoyed the course.	Phase B	286	3.86	.954	.056
	Phase A	235	3.71	1.056	.069
17. It is very likely to revisit the course materials in the future.	Phase B	286	4.15	.910	.054
	Phase A	235	4.02	1.062	.069
18. It is very likely to recommend this course e.g. to a colleague or friend.	Phase B	286	3.99	1.003	.059
	Phase A	235	3.89	1.044	.068

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
1. The course platform was easy to use.	Equal variances assumed	.604	.438	-2.218	519	.027	-.195	.088	-.367	-.022
	Equal variances not assumed			-2.210	492.895	.028	-.195	.088	-.368	-.022
2. The overall visual design of the course was appealing.	Equal variances assumed	1.429	.232	-1.200	519	.231	-.099	.083	-.262	.063
	Equal variances not assumed			-1.196	491.721	.232	-.099	.083	-.262	.064
3. The course environment was well structured. topics and subtopics were logically arranged in a predictable pattern.	Equal variances assumed	.272	.603	1.331	519	.184	.102	.077	-.049	.252
	Equal variances not assumed			1.317	475.572	.188	.102	.077	-.050	.254
4. The learning path was easy to navigate.	Equal variances assumed	.016	.900	-.938	519	.348	-.088	.094	-.273	.096
	Equal variances not assumed			-.936	495.194	.350	-.088	.094	-.273	.097
5. Course objectives and learning goals were clearly stated.	Equal variances assumed	1.500	.221	.739	519	.460	.050	.068	-.084	.184
	Equal variances not assumed			.734	484.940	.463	.050	.069	-.084	.185
6. The workload was reasonably spread.	Equal variances assumed	.006	.936	-1.167	519	.244	-.106	.090	-.283	.072
	Equal variances not assumed			-1.163	492.788	.245	-.106	.091	-.284	.073

7. The workload was in line with my expectations.	Equal variances assumed	2.444	.119	-1.886	519	.060	-.186	.099	-.380	.008
	Equal variances not assumed			-1.899	510.211	.058	-.186	.098	-.379	.006
8. The course difficulty was in line with my expectations at the start of the course.	Equal variances assumed	1.612	.205	-1.844	519	.066	-.181	.098	-.373	.012
	Equal variances not assumed			-1.855	509.569	.064	-.181	.097	-.372	.011
9. The difficulty level of assessments was appropriate for the course.	Equal variances assumed	1.310	.253	-.106	519	.916	-.009	.081	-.167	.150
	Equal variances not assumed			-.105	487.210	.916	-.009	.081	-.168	.151
10. The level of interaction with peer learners was adequate.	Equal variances assumed	1.306	.254	1.180	519	.239	.101	.085	-.067	.268
	Equal variances not assumed			1.184	506.478	.237	.101	.085	-.066	.267
11. The discussion forums were an effective tool for collaborating with other learners.	Equal variances assumed	1.368	.243	.330	519	.742	.032	.096	-.157	.220
	Equal variances not assumed			.332	509.536	.740	.032	.095	-.156	.219
12. Help and support provided on the course platform were adequate.	Equal variances assumed	6.359	.012	4.291	519	.000	.358	.083	.194	.522
	Equal variances not assumed			4.245	474.294	.000	.358	.084	.192	.524
13. I can apply the knowledge created in this course to my work or other related activities.	Equal variances assumed	.365	.546	-.161	519	.872	-.012	.077	-.163	.138
	Equal variances not assumed			-.161	498.375	.872	-.012	.077	-.163	.138
14. I was motivated to work through the course.	Equal variances assumed	7.974	.005	2.692	519	.007	.231	.086	.062	.400
	Equal variances not assumed			2.658	469.054	.008	.231	.087	.060	.402
15. I feel like I achieved my personal goals for this course.	Equal variances assumed	5.730	.017	2.237	519	.026	.173	.077	.021	.324
	Equal variances not assumed			2.207	467.808	.028	.173	.078	.019	.326
16. I enjoyed the course.	Equal variances assumed	2.582	.109	1.705	519	.089	.150	.088	-.023	.323
	Equal variances not assumed			1.688	476.935	.092	.150	.089	-.025	.325
17. It is very likely to revisit the course materials in the future.	Equal variances assumed	1.499	.221	1.503	519	.134	.130	.086	-.040	.300
	Equal variances not assumed			1.480	463.007	.139	.130	.088	-.043	.302
18. It is very likely to recommend this course e.g. to a colleague or friend.	Equal variances assumed	.041	.839	1.113	519	.266	.100	.090	-.077	.277
	Equal variances not assumed			1.109	491.505	.268	.100	.090	-.077	.278

Appendix E – Validation of Instruments & Tests of Normality

Test of Normality – Pre-course survey

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Completion	.479	1193	.000	.519	1193	.000
M1	.345	1193	.000	.700	1193	.000
M2	.396	1193	.000	.549	1193	.000
M3	.158	1193	.000	.901	1193	.000
M4	.197	1193	.000	.866	1193	.000
M5	.202	1193	.000	.839	1193	.000
M6	.151	1193	.000	.891	1193	.000
M7	.338	1193	.000	.782	1193	.000
M8	.153	1193	.000	.907	1193	.000
IntMotivation	.076	1193	.000	.959	1193	.000
ExtMotivation	.083	1193	.000	.982	1193	.000
Motivation	.059	1193	.000	.980	1193	.000
GamificationAttitude	.297	1193	.000	.789	1193	.000
Interacting with others is important to me.	.213	1193	.000	.871	1193	.000
It makes me happy if I am able to help others.	.259	1193	.000	.793	1193	.000
It is important to me to follow my own path.	.190	1193	.000	.903	1193	.000
I like being part of a team.	.216	1193	.000	.885	1193	.000
I like to provoke.	.148	1193	.000	.923	1193	.000
I like competitions where a prize can be won.	.126	1193	.000	.946	1193	.000
It is important to me to feel like I am part of a community.	.222	1193	.000	.884	1193	.000
I often let my curiosity guide me.	.213	1193	.000	.891	1193	.000
I like to question the status quo.	.160	1193	.000	.929	1193	.000
Rewards are a great way to motivate me.	.176	1193	.000	.933	1193	.000
I like to try new things.	.232	1193	.000	.817	1193	.000
I like defeating obstacles.	.221	1193	.000	.856	1193	.000
I like helping others to orient themselves in new situations.	.238	1193	.000	.859	1193	.000
I see myself as a rebel.	.135	1193	.000	.941	1193	.000
I enjoy group activities.	.188	1193	.000	.911	1193	.000
It is important to me to always carry out my tasks completely.	.235	1193	.000	.846	1193	.000
I dislike following rules.	.195	1193	.000	.914	1193	.000
I like sharing my knowledge	.246	1193	.000	.821	1193	.000
It is difficult for me to let go of a problem before I have found a solution.	.222	1193	.000	.886	1193	.000
Return of investment is important to me.	.175	1193	.000	.920	1193	.000
Being independent is important to me.	.228	1193	.000	.871	1193	.000
I like mastering difficult tasks.	.237	1193	.000	.875	1193	.000
The well-being of others is important to me.	.247	1193	.000	.849	1193	.000
If the reward is sufficient I will put in the effort.	.153	1193	.000	.933	1193	.000
age	.070	1193	.000	.979	1193	.000
GRIT1	.197	1193	.000	.904	1193	.000
GRIT2	.203	1193	.000	.902	1193	.000
GRIT3	.247	1193	.000	.888	1193	.000
GRIT4	.257	1193	.000	.798	1193	.000
GRIT5	.255	1193	.000	.885	1193	.000
GRIT6	.254	1193	.000	.879	1193	.000
GRIT7	.234	1193	.000	.861	1193	.000
GRIT8	.220	1193	.000	.840	1193	.000
GRIT	.091	1193	.000	.973	1193	.000
D1S1	.181	1193	.000	.882	1193	.000
D1S2	.217	1193	.000	.853	1193	.000

D2S1	.230	1193	.000	.845	1193	.000
D2S2	.263	1193	.000	.818	1193	.000
D2S3	.272	1193	.000	.812	1193	.000
D2S4	.199	1193	.000	.863	1193	.000
D3S1	.261	1193	.000	.813	1193	.000
D3S2	.204	1193	.000	.871	1193	.000
D4S1	.274	1193	.000	.806	1193	.000
D4S2	.243	1193	.000	.821	1193	.000
D4S3	.256	1193	.000	.819	1193	.000
D4S4	.280	1193	.000	.800	1193	.000
D5S1	.247	1193	.000	.828	1193	.000
D5S2	.281	1193	.000	.798	1193	.000
D6S1	.214	1193	.000	.848	1193	.000
D6S2	.205	1193	.000	.863	1193	.000
D6S3	.269	1193	.000	.808	1193	.000
D1	.153	1193	.000	.909	1193	.000
D2	.151	1193	.000	.901	1193	.000
D3	.162	1193	.000	.894	1193	.000
D4	.181	1193	.000	.868	1193	.000
D5	.231	1193	.000	.846	1193	.000
D6	.149	1193	.000	.894	1193	.000
NumGroup	.312	1193	.000	.822	1193	.000
Confidence to learn material	.252	1193	.000	.872	1193	.000
Time commitment in course	.247	1193	.000	.864	1193	.000
Time allocation	.247	1193	.000	.882	1193	.000
Experience	.207	1193	.000	.830	1193	.000
Experience Ed Tech	.335	1193	.000	.697	1193	.000
English Proficiency	.214	1193	.000	.846	1193	.000
Comfort with Technology	.253	1193	.000	.811	1193	.000

a. Lilliefors Significance Correction

Test of Normality – Post-course survey

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
1. The course platform was easy to use.	.220	218	.000	.856	218	.000
2. The overall visual design of the course was appealing.	.240	218	.000	.841	218	.000
3. The course environment was well structured. topics and subtopics were logically arranged in a predictable pattern.	.247	218	.000	.809	218	.000
4. The learning path was easy to navigate.	.226	218	.000	.857	218	.000
5. Course objectives and learning goals were clearly stated.	.309	218	.000	.755	218	.000
6. The workload was reasonably spread.	.250	218	.000	.884	218	.000
7. The workload was in line with my expectations.	.193	218	.000	.908	218	.000
8. The course difficulty was in line with my expectations at the start of the course.	.221	218	.000	.903	218	.000
9. The difficulty level of assessment tasks (quiz learning activities) was appropriate for the course.	.258	218	.000	.860	218	.000
10. The level of interaction with peer learners was adequate.	.196	218	.000	.897	218	.000
11. The discussion forums were an effective tool for collaborating with other learners.	.183	218	.000	.911	218	.000
12. Help and support provided on the course platform were adequate.	.206	218	.000	.861	218	.000
13. I can apply the knowledge created in this course to my work or other related activities.	.237	218	.000	.858	218	.000
14. I was motivated to work through the course.	.232	218	.000	.863	218	.000
15. I feel like I achieved my personal goals for this course.	.266	218	.000	.841	218	.000
16. I enjoyed the course.	.218	218	.000	.868	218	.000
17. It is very likely to revisit the course materials in the future.	.231	218	.000	.824	218	.000
18. It is very likely to recommend this course e.g. to a colleague or friend.	.215	218	.000	.848	218	.000

12. Final Assessment for the Level A Certificate required the learner to have acquired a basic set of competences for EDL.	.235	218	.000	.833	218	.000
13. The difficulty level of assessments was appropriate for the Level A Certificate.	.272	218	.000	.846	218	.000
16. The difficulty level of assessments was appropriate for the Level B Certificate.	.276	218	.000	.829	218	.000
14. Assessment for the Level B Certificate required demonstration of a higher expertise in EDL.	.252	218	.000	.811	218	.000
15. Assessment for the Level B Certificate included hands-on assignments based on simulated practice scenarios.	.269	218	.000	.821	218	.000
D1S1_post	.265	218	.000	.883	218	.000
D1S2_post	.259	218	.000	.884	218	.000
D2S1_post	.244	218	.000	.889	218	.000
D2S2_post	.247	218	.000	.891	218	.000
D2S3_post	.225	218	.000	.893	218	.000
D2S4_post	.221	218	.000	.901	218	.000
D3S1_post	.214	218	.000	.900	218	.000
D3S2_post	.209	218	.000	.904	218	.000
D4S1_post	.213	218	.000	.899	218	.000
D4S2_post	.198	218	.000	.909	218	.000
D4S3_post	.214	218	.000	.905	218	.000
D4S4_post	.224	218	.000	.894	218	.000
D5S1_post	.214	218	.000	.902	218	.000
D5S2_post	.231	218	.000	.896	218	.000
D6S1_post	.210	218	.000	.901	218	.000
D6S2_post	.217	218	.000	.904	218	.000
D6S3_post	.199	218	.000	.908	218	.000
D1_post	.226	218	.000	.927	218	.000
D2_post	.169	218	.000	.961	218	.000
D3_post	.184	218	.000	.936	218	.000
D4_post	.145	218	.000	.961	218	.000
D5_post	.197	218	.000	.932	218	.000
D6_post	.149	218	.000	.956	218	.000
D1S1_adv	.196	218	.000	.923	218	.000
D1S2_adv	.193	218	.000	.925	218	.000
D2S1_adv	.193	218	.000	.929	218	.000
D2S2_adv	.179	218	.000	.926	218	.000
D2S3_adv	.176	218	.000	.921	218	.000
D2S4_adv	.209	218	.000	.914	218	.000
D3S1_adv	.197	218	.000	.915	218	.000
D3S2_adv	.196	218	.000	.923	218	.000
D4S1_adv	.191	218	.000	.912	218	.000
D4S2_adv	.191	218	.000	.922	218	.000
D4S3_adv	.201	218	.000	.916	218	.000
D4S4_adv	.195	218	.000	.916	218	.000
D5S1_adv	.194	218	.000	.924	218	.000
D5S2_adv	.192	218	.000	.924	218	.000
D6S1_adv	.195	218	.000	.925	218	.000
D6S2_adv	.184	218	.000	.933	218	.000
D6S3_adv	.206	218	.000	.921	218	.000
D6_adv	.106	218	.000	.981	218	.004
D5_adv	.171	218	.000	.960	218	.000
D4_adv	.103	218	.000	.978	218	.002
D3_adv	.120	218	.000	.968	218	.000
D2_adv	.085	218	.001	.982	218	.007
D1_adv	.140	218	.000	.967	218	.000
EDL_adv	.042	218	.200*	.993	218	.380
LO_Mod2	.258	218	.000	.776	218	.000
LO_Mod3	.268	218	.000	.779	218	.000
LO_Mod4	.266	218	.000	.788	218	.000
LO_Mod5	.260	218	.000	.787	218	.000
LO_Mod6	.250	218	.000	.804	218	.000
LO_Mod7	.244	218	.000	.809	218	.000
CONT_Mod2	.271	218	.000	.805	218	.000

CONT_Mod3	.260	218	.000	.813	218	.000
CONT_Mod4	.278	218	.000	.812	218	.000
CONT_Mod5	.269	218	.000	.821	218	.000
CONT_Mod6	.261	218	.000	.832	218	.000
CONT_Mod7	.286	218	.000	.830	218	.000
MAT_relevant_Mod2	.260	218	.000	.756	218	.000
MAT_relevant_Mod3	.247	218	.000	.782	218	.000
MAT_relevant_Mod4	.259	218	.000	.770	218	.000
MAT_relevant_Mod5	.257	218	.000	.785	218	.000
MAT_relevant_Mod6	.254	218	.000	.809	218	.000
MAT_relevant_Mod7	.273	218	.000	.785	218	.000
UPDATED_Mod2	.244	218	.000	.773	218	.000
UPDATED_Mod3	.250	218	.000	.776	218	.000
UPDATED_Mod4	.249	218	.000	.780	218	.000
UPDATED_Mod5	.247	218	.000	.788	218	.000
UPDATED_Mod6	.245	218	.000	.788	218	.000
UPDATED_Mod7	.244	218	.000	.792	218	.000
VIDEO_Mod2	.251	218	.000	.795	218	.000
VIDEO_Mod3	.236	218	.000	.800	218	.000
VIDEO_Mod4	.243	218	.000	.802	218	.000
VIDEO_Mod5	.222	218	.000	.834	218	.000
VIDEO_Mod6	.234	218	.000	.823	218	.000
VIDEO_Mod7	.231	218	.000	.830	218	.000
GRAPHICS_Mod2	.274	218	.000	.770	218	.000
GRAPHICS_Mod3	.269	218	.000	.781	218	.000
GRAPHICS_Mod4	.262	218	.000	.794	218	.000
GRAPHICS_Mod5	.247	218	.000	.789	218	.000
GRAPHICS_Mod6	.258	218	.000	.796	218	.000
GRAPHICS_Mod7	.242	218	.000	.801	218	.000
CONTTYPES_Mod2	.257	218	.000	.741	218	.000
CONTTYPES_Mod3	.268	218	.000	.762	218	.000
CONTTYPES_Mod4	.257	218	.000	.777	218	.000
CONTTYPES_Mod5	.250	218	.000	.790	218	.000
CONTTYPES_Mod6	.246	218	.000	.790	218	.000
CONTTYPES_Mod7	.245	218	.000	.796	218	.000
READINGS_Mod2	.207	218	.000	.848	218	.000
READINGS_Mod3	.213	218	.000	.853	218	.000
READINGS_Mod4	.209	218	.000	.852	218	.000
READINGS_Mod5	.196	218	.000	.855	218	.000
READINGS_Mod6	.200	218	.000	.863	218	.000
READINGS_Mod7	.196	218	.000	.858	218	.000
POLL_Mod2	.256	218	.000	.849	218	.000
POLL_Mod3	.259	218	.000	.851	218	.000
POLL_Mod4	.250	218	.000	.858	218	.000
POLL_Mod5	.228	218	.000	.873	218	.000
POLL_Mod6	.238	218	.000	.870	218	.000
POLL_Mod7	.234	218	.000	.877	218	.000
QUIZ_Mod2	.279	218	.000	.791	218	.000
QUIZ_Mod3	.264	218	.000	.792	218	.000
QUIZ_Mod4	.271	218	.000	.803	218	.000
QUIZ_Mod5	.260	218	.000	.823	218	.000
QUIZ_Mod6	.247	218	.000	.827	218	.000
QUIZ_Mod7	.257	218	.000	.831	218	.000
ASSESS_Mod2	.273	218	.000	.780	218	.000
ASSESS_Mod3	.278	218	.000	.777	218	.000
ASSESS_Mod4	.269	218	.000	.783	218	.000
ASSESS_Mod5	.250	218	.000	.805	218	.000
ASSESS_Mod6	.244	218	.000	.801	218	.000
ASSESS_Mod7	.246	218	.000	.801	218	.000
HOURS_Mod2	.175	218	.000	.886	218	.000
HOURS_Mod3	.196	218	.000	.889	218	.000
HOURS_Mod4	.155	218	.000	.895	218	.000
HOURS_Mod5	.164	218	.000	.890	218	.000
HOURS_Mod6	.147	218	.000	.898	218	.000

HOURS_Mod7	.149	218	.000	.901	218	.000
POSTS_Mod2	.252	218	.000	.807	218	.000
POSTS_Mod3	.239	218	.000	.802	218	.000
POSTS_Mod4	.262	218	.000	.790	218	.000
POSTS_Mod5	.298	218	.000	.769	218	.000
POSTS_Mod6	.317	218	.000	.755	218	.000
POSTS_Mod7	.335	218	.000	.739	218	.000
PEoU1	.220	218	.000	.856	218	.000
PEoU2	.240	218	.000	.841	218	.000
PEoU3	.247	218	.000	.809	218	.000
PEoU4	.226	218	.000	.857	218	.000
PEoU5	.206	218	.000	.861	218	.000
LX1	.309	218	.000	.755	218	.000
LX2	.250	218	.000	.884	218	.000
LX3	.193	218	.000	.908	218	.000
LX4	.221	218	.000	.903	218	.000
LX5	.258	218	.000	.860	218	.000
LX6	.196	218	.000	.897	218	.000
LX7	.183	218	.000	.911	218	.000
CONF1	.237	218	.000	.858	218	.000
CONF2	.266	218	.000	.841	218	.000
SAT1	.232	218	.000	.863	218	.000
SAT2	.218	218	.000	.868	218	.000
INT1	.231	218	.000	.824	218	.000
INT2	.215	218	.000	.848	218	.000
leaderboard1	.216	218	.000	.893	218	.000
leaderboard2	.206	218	.000	.888	218	.000
leaderboard3	.226	218	.000	.885	218	.000
leaderboard4	.207	218	.000	.886	218	.000
leaderboard5	.217	218	.000	.889	218	.000
leaderboard6	.243	218	.000	.880	218	.000
leaderboard7	.208	218	.000	.892	218	.000
leaderboard8	.216	218	.000	.891	218	.000
leaderboard9	.215	218	.000	.889	218	.000
leaderboard10	.227	218	.000	.878	218	.000
Bar1	.229	218	.000	.855	218	.000
Bar2	.249	218	.000	.845	218	.000
Bar3	.244	218	.000	.864	218	.000
Bar4	.254	218	.000	.840	218	.000
Bar5	.250	218	.000	.864	218	.000
Bar6	.214	218	.000	.874	218	.000
Bar7	.226	218	.000	.858	218	.000
Bar8	.222	218	.000	.855	218	.000
Bar9	.239	218	.000	.862	218	.000
Bar10	.257	218	.000	.823	218	.000
Levels1	.242	218	.000	.867	218	.000
Levels2	.255	218	.000	.858	218	.000
Levels3	.222	218	.000	.885	218	.000
Levels4	.241	218	.000	.870	218	.000
Levels5	.232	218	.000	.879	218	.000
Levels6	.208	218	.000	.884	218	.000
Levels7	.223	218	.000	.873	218	.000
Levels8	.220	218	.000	.878	218	.000
Levels9	.215	218	.000	.879	218	.000
Levels10	.225	218	.000	.856	218	.000
Badges1	.236	218	.000	.862	218	.000
Badges2	.231	218	.000	.869	218	.000
Badges3	.189	218	.000	.883	218	.000
Badges4	.208	218	.000	.882	218	.000
Badges5	.200	218	.000	.890	218	.000
Badges6	.189	218	.000	.894	218	.000
Badges7	.188	218	.000	.889	218	.000
Badges8	.205	218	.000	.891	218	.000
Badges9	.204	218	.000	.886	218	.000

Badges10	.210	218	.000	.866	218	.000
Points1	.260	218	.000	.867	218	.000
Points2	.268	218	.000	.854	218	.000
Points3	.248	218	.000	.868	218	.000
Points4	.207	218	.000	.884	218	.000
Points5	.232	218	.000	.871	218	.000
Points6	.220	218	.000	.889	218	.000
Points7	.209	218	.000	.884	218	.000
Points8	.232	218	.000	.880	218	.000
Points9	.238	218	.000	.873	218	.000
Points10	.272	218	.000	.837	218	.000
Gamf_Sat1	.234	218	.000	.865	218	.000
Gamf_Sat2	.234	218	.000	.865	218	.000
Gamf_Sat3	.229	218	.000	.865	218	.000
Gamf_Sat4	.278	218	.000	.817	218	.000
Gamf_Sat5	.217	218	.000	.863	218	.000
Gamf_Sat6	.205	218	.000	.864	218	.000
Gamf_Sat7	.250	218	.000	.872	218	.000
Gamf_Sat8	.254	218	.000	.844	218	.000
Gamf_Sat9	.212	218	.000	.881	218	.000
Gamf_Sat10	.233	218	.000	.877	218	.000
Gamf_Sat11	.228	218	.000	.875	218	.000
Gamf_Sat12	.277	218	.000	.852	218	.000
Gamf_Sat13	.236	218	.000	.872	218	.000
Gamf_Accomp1	.239	218	.000	.863	218	.000
Gamf_Accomp2	.254	218	.000	.876	218	.000
Gamf_Accomp3	.216	218	.000	.891	218	.000
Gamf_Accomp4	.206	218	.000	.889	218	.000
Gamf_Accomp5	.240	218	.000	.873	218	.000
Gamf_Accomp6	.187	218	.000	.902	218	.000
Gamf_Accomp7	.263	218	.000	.856	218	.000
Gamf_Accomp8	.238	218	.000	.875	218	.000
Gamf_Accomp9	.192	218	.000	.896	218	.000
Gamf_Accomp10	.173	218	.000	.913	218	.000
Gamf_Accomp11	.202	218	.000	.896	218	.000
Gamf_Accomp12	.241	218	.000	.879	218	.000
Gamf_Accomp13	.233	218	.000	.886	218	.000
Gamf_Accomp14	.187	218	.000	.909	218	.000
Gamf_Usef1	.264	218	.000	.863	218	.000
Gamf_Usef2	.272	218	.000	.865	218	.000
Gamf_Usef3	.270	218	.000	.857	218	.000
Gamf_Usef4	.263	218	.000	.842	218	.000
POST_Mod2	.252	218	.000	.807	218	.000
POST_Mod3	.239	218	.000	.802	218	.000
POST_Mod4	.262	218	.000	.790	218	.000
POST_Mod5	.298	218	.000	.769	218	.000
POST_Mod6	.317	218	.000	.755	218	.000
POST_Mod7	.335	218	.000	.739	218	.000
PEoU	.094	218	.000	.951	218	.000
LX	.076	218	.004	.979	218	.003
CONF	.152	218	.000	.930	218	.000
SAT	.159	218	.000	.924	218	.000
INT	.167	218	.000	.889	218	.000

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Reliability of Instruments

- **Gamification User Types**

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.919	.925	24

Correlations

		GU1	GU2	GU3	GU4	GU5	GU6	GU7	GU8	GU9	GU10	GU11	GU12	GU13	GU14	GU15	GU16	GU17	GU18	GU19	GU20	GU21	GU22	GU23	GU24
GU1	Pearson Cor.	1	.712**	.238**	.652**	.189**	.269**	.624**	.298**	.280**	.291**	.456**	.408**	.559**	.224**	.644**	.429**	0.011	.500**	.269**	.215**	.220**	.360**	.471**	.152**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.707	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU2	Pearson Cor.	.712**	1	.313**	.627**	.115**	.271**	.584**	.357**	.254**	.305**	.534**	.509**	.676**	.182**	.523**	.524**	-0.05	.616**	.403**	.275**	.339**	.469**	.600**	.175**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.111	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU3	Pearson Cor.	.238**	.313**	1	.184**	.214**	.194**	.192**	.376**	.292**	.176**	.324**	.340**	.278**	.196**	.131**	.341**	.112**	.294**	.249**	.202**	.495**	.339**	.305**	.215**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU4	Pearson Cor.	.652**	.627**	.184**	1	.153**	.285**	.694**	.308**	.280**	.279**	.469**	.430**	.558**	.209**	.725**	.420**	-0.016	.538**	.275**	.235**	.180**	.399**	.497**	.139**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.577	0.000	0.000	0.000	0.000	0.000	0.000	0.000

	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU5	Pearson Cor.	.189*	.115*	.214*	.153*	1	.400*	.162*	.274*	.409*	.266*	.178*	.213*	.195*	.457*	.212*	.100*	.319*	.155*	.122*	.167*	.145*	.178*	.085*	.165**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU6	Pearson Cor.	.269*	.271*	.194*	.285*	.400*	1	.347*	.288*	.298*	.673*	.319*	.373*	.295*	.327*	.348*	.313*	.082*	.230*	.253*	.399*	.254*	.334*	.218*	.444**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU7	Pearson Cor.	.624*	.584*	.192*	.694*	.162*	.347*	1	.357*	.290*	.361*	.460*	.434*	.578*	.228*	.683*	.428*	0.003	.507*	.301*	.282*	.215*	.358*	.504*	.196**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.922	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU8	Pearson Cor.	.298*	.357*	.376*	.308*	.274*	.288*	.357*	1	.537*	.269*	.582*	.491*	.405*	.307*	.284*	.354*	.169*	.413*	.316*	.231*	.342*	.460*	.370*	.214**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU9	Pearson Cor.	.280*	.254*	.292*	.280*	.409*	.298*	.290*	.537*	1	.309*	.386*	.387*	.348*	.496*	.307*	.242*	.316*	.346*	.275*	.270*	.314*	.405*	.291*	.223**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU10	Pearson Cor.	.291*	.305*	.176*	.279*	.266*	.673*	.361*	.269*	.309*	1	.357*	.383*	.315*	.274*	.338*	.332*	.076*	.248*	.242*	.474*	.285*	.334*	.275*	.570**

	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU11	Pearson Cor.	.456**	.534**	.324**	.469**	.178**	.319**	.460**	.582**	.386**	.357**	1	.677**	.552**	.269**	.459**	.517**	0.040	.578**	.407**	.344**	.435**	.582**	.480**	.215**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.163	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU12	Pearson Cor.	.408**	.509**	.340**	.430**	.213**	.373**	.434**	.491**	.387**	.383**	.677**	1	.587**	.339**	.433**	.557**	0.055	.576**	.493**	.392**	.451**	.681**	.526**	.261**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.054	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU13	Pearson Cor.	.559**	.676**	.278**	.558**	.195**	.295**	.578**	.405**	.348**	.315**	.552**	.587**	1	.275**	.543**	.502**	0.021	.668**	.436**	.338**	.365**	.547**	.637**	.216**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.467	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU14	Pearson Cor.	.224**	.182**	.196**	.209**	.457**	.327**	.228**	.307**	.496**	.274**	.269**	.339**	.275**	1	.321**	.214**	.430**	.235**	.231**	.275**	.264**	.292**	.199**	.218**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU15	Pearson Cor.	.644**	.523**	.131**	.725**	.212**	.348**	.683**	.284**	.307**	.338**	.459**	.433**	.543**	.321**	1	.458**	0.006	.520**	.286**	.252**	.185**	.389**	.470**	.180**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.839	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249

GU16	Pearson Cor.	.429**	.524**	.341**	.420**	.100**	.313**	.428**	.354**	.242**	.332**	.517**	.557**	.502**	.214**	.458**	1	-0.047	.549**	.552**	.381**	.423**	.526**	.532**	.241**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.096	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU17	Pearson Cor.	0.011	-0.045	.112**	-0.016	.319**	.082**	0.003	.169**	.316**	.076**	0.040	0.055	0.021	.430**	0.006	-0.047	1	0.001	.097**	.078**	.120**	.061*	-0.009	.080**
	Sig. (2-tailed)	0.707	0.111	0.000	0.577	0.000	0.004	0.922	0.000	0.000	0.007	0.163	0.054	0.467	0.000	0.839	0.096		0.975	0.001	0.006	0.000	0.032	0.743	0.005
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU18	Pearson Cor.	.500**	.616**	.294**	.538**	.155**	.230**	.507**	.413**	.346**	.248**	.578**	.576**	.668**	.235**	.520**	.549**	0.001	1	.456**	.376**	.398**	.567**	.627**	.191**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.975		0.000	0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU19	Pearson Cor.	.269**	.403**	.249**	.275**	.122**	.253**	.301**	.316**	.275**	.242**	.407**	.493**	.436**	.231**	.286**	.552**	.097**	.456**	1	.408**	.370**	.515**	.443**	.232**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000		0.000	0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU20	Pearson Cor.	.215**	.275**	.202**	.235**	.167**	.399**	.282**	.231**	.270**	.474**	.344**	.392**	.338**	.275**	.252**	.381**	.078**	.376**	.408**	1	.426**	.405**	.376**	.458**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000		0.000	0.000	0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU21	Pearson Cor.	.220**	.339**	.495**	.180**	.145**	.254**	.215**	.342**	.314**	.285**	.435**	.451**	.365**	.264**	.185**	.423**	.120**	.398**	.370**	.426**	1	.501**	.431**	.331**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		0.000	0.000	0.000

	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU22	Pearson Cor.	.360**	.469**	.339**	.399**	.178**	.334**	.358**	.460**	.405**	.334**	.582**	.681**	.547**	.292**	.389**	.526**	.061*	.567**	.515**	.405**	.501**	1	.570**	.305**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.032	0.000	0.000	0.000	0.000		0.000	0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU23	Pearson Cor.	.471**	.600**	.305**	.497**	.085**	.218**	.504**	.370**	.291**	.275**	.480**	.526**	.637**	.199**	.470**	.532**	-0.009	.627**	.443**	.376**	.431**	.570**	1	.288**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.743	0.000	0.000	0.000	0.000	0.000		0.000
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249
GU24	Pearson Cor.	.152**	.175**	.215**	.139**	.165**	.444**	.196**	.214**	.223**	.570**	.215**	.261**	.216**	.218**	.180**	.241**	.080**	.191**	.232**	.458**	.331**	.305**	.288**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	
	N	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249	1249

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

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