Assessing Learning Outcomes in Gamified vs. Conventional Approaches

Nick Chevalier & Pooja Ravindra Potdar

Department of Education, Instructional Design and Technology, The University of Tampa

EME 603: Inquiry and Measurement

Dr. Minkyoung Kim

December 10, 2024

Table of Contents

Abstract 3

Assessing Learning Outcomes in Gamified vs. Conventional Approaches 4

The Problem Statement 6

The Purpose of Study 7

Research Questions 7

Hypothesis 8

Literature Review 8

Data Collection 12

Results 13

Implications 22

Limitations 23

Ethical Considerations 24

Conclusion 25

References 26

Appendix A 28

Appendix B 30

Appendix C 33

Appendix D 34

Appendix E 35

Appendix F 37

Abstract

This study investigates the impact of gamified versus traditional instructional approaches on learning outcomes, engagement, and knowledge retention among UTampa faculty and student employees. Participants were divided into two groups: one received conventional written instructions, and the other engaged with gamified training, incorporating elements like challenges, feedback, and storytelling. Both groups completed a task in the YuJa video content management system and provided feedback via a qualitative survey. The research evaluates whether gamification enhances knowledge acquisition and learner engagement compared to traditional methods and explores which game elements most effectively contribute to improved outcomes. Findings aim to provide empirical evidence on the educational efficacy of gamified instruction.

Keywords: gamification, learning outcomes, engagement, knowledge retention, instructional design, faculty development, higher education.

Assessing Learning Outcomes in Gamified vs. Conventional Approaches

As gamification in learning design increases in popularity as a means to keep learners engaged, educators and learning theorists have no shortage of questions. Which methods or game elements capture learners' attention? Why are game elements such an effective engagement tool? And which ones affect a measurable increase in knowledge retention or meeting learning objectives?

In this study, we aim to determine whether or not gamified instruction yields more effective learning results than traditional written instruction. Moreover, we seek to determine whether gamified instruction yields a measurable increase in learners' abilities to meet the provided learning objectives. To do this, we have provided two groups of UTampa faculty and student employees with separate modes of instruction on the same topic: how to create a YuJa video quiz. One group of learners, the control group, was given a series of written instructions on completing the task, while the other group of learners was given an interactive, gamified version of the same instruction. Specifically, the gamified instruction contained the following game elements: the ability to earn points, immediate positive/negative feedback (dependent upon the user input), challenging tasks to complete, a framing narrative, and a game-like interface in which the user clicks through a simulated task to progress through the instruction. After receiving the instruction, participants were given a qualitative survey to understand their learning experience and evaluate their feelings and attitudes toward the received training and the perceived benefit.

For purposes of definition, the following items are explained:

YuJa

YuJa is the University of Tampa's video content management system, adopted in September 2024. Users can record and upload videos, as well as create graded video quizzes for integration into Learning Management Systems (LMSs). This research is timely, as faculty and students are currently learning how to use the platform.

Instructional Activities Provided

The following instructional activities were provided to the control and experimental groups, respectively:

Conventional Activity

The conventional activity consists of numbered text instructions accompanied by annotated screenshots, a step-by-step guide detailing how to create a question-based video quiz in YuJa.

Gamified Activity

The gamified activity, titled "YuJa Quiz Master," takes the same steps from the conventional activity presents them as a virtual simulation where the participant uses a computing device to actually click through the steps, as if using the YuJa platform. The game includes narrated voiceover, optional closed captoning, and a help button which, when selected, provides narrated feedback and hints on the next successful step. Participants can enter their name for personalization, and throughout the game, participants earn badges by completing tasks.

The Problem Statement

Our research compares the impact of gamified versus conventional approaches on learning outcomes. Traditional instructional materials like written guides often struggle to keep learners engaged and help them retain knowledge. Gamification has increased relevance since 2010 for learner retention and engagement (Deterding et al., 2011; Seaborn & Fels, 2015). Despite its growing popularity for boosting engagement and motivation, there is limited empirical evidence on its impact on learning outcomes. Research shows that effective game-based learning goes beyond superficial elements and involves meaningful challenges, engaging narratives, and real-time feedback (Kapp & Coné, 2012).

This study aims to fill this gap by comparing the effectiveness of gamified instructional methods with conventional ones, focusing on measurable learning outcomes. We seek to evaluate whether incorporating game elements like challenges, storytelling, and real-time feedback can enhance learner engagement and improve knowledge retention compared to traditional approaches. By comparing learner performance using a traditional written guide with an interactive, gamified version, we will determine if outcomes are significantly different.

Furthermore, this research will identify which specific game elements, if any, most effectively contribute to improved educational results. As Kapp and Coné (2012) highlighted, gamification involves deeper game-based mechanics that emphasize engagement, motivation, and the real-world application of learning, going beyond superficial additions like points and badges. This study will explore whether these deeper elements offer measurable benefits, contributing to a broader understanding of gamification's role in modern education.

The Purpose of Study

The main objective of this study is to determine whether gamified instruction has a measurable impact on learning objectives. If it does, we also seek to understand how extensive the impact is and which gamification elements contribute most to this effectiveness. If it turns out that gamified instruction does not have a measurable impact on learning objectives, we will pivot to try and ascertain why this is and whether the game elements themselves caused a lack of impact or if some external, unexpected variable(s) impacted the learners' knowledge retention and/or ability to complete the final measured task.

Research Questions

Overarching Research Question

How do gamified instructional methods compare to conventional instructional methods in terms of learning outcomes, engagement, and knowledge retention?

Sub-questions

1. What specific learning outcomes (e.g., knowledge acquisition, skill development, problem-solving abilities) are achieved through gamified methods compared to conventional methods?
2. How do learner engagement (e.g., participation frequency, time spent on tasks, enthusiasm) and knowledge retention differ between the two methods?
3. Which gamification elements (e.g., challenges, aesthetics, feedback, storytelling) are most effective for engagement and knowledge retention?

Hypothesis

H1 (Primary Hypothesis) is gamified instructional methods will result in significantly higher learning outcomes compared to conventional instructional methods. H2 (Engagement Hypothesis) is learners who engage with gamified instructional methods will demonstrate higher levels of engagement, such as participation frequency, time spent on tasks, and enthusiasm, compared to those using conventional methods. H3 (Retention Hypothesis) is gamified instructional methods will lead to better long-term knowledge retention compared to conventional instructional methods. H4 (Element Effectiveness Hypothesis) is specific game elements, such as storytelling, challenges, and real-time feedback, will be more effective in promoting learner engagement and knowledge retention compared to other elements like badges.

Literature Review

In Kapp & Coné's 2012 white paper, *What Every Chief Learning Officer Needs to Know about Games and Gamification for Learning*, the authors posit that gamification in learning design needs to go beyond superficial game elements such as points and leaderboards and focus on the aspects of what makes games meaningful. To Kapp & Coné, this would include "continual corrective feedback, storytelling, challenge and the freedom to fail." These are the elements we vied to incorporate into our gamified instruction, so in that respect, this white paper helps key us into which methods might prove most effective for our study. However, the white paper is brief and only lightly touches on these elements as being important and does not explain or reinforce how or why these elements are proven to be effective. However, despite this, Kapp in particular is a well-published leader in gamification study, so his reputation on the subject lends to his credibility.

Meanwhile, Krath, Schürmann, & von Korflesch's 2021 article, *Revealing the theoretical basis of gamification: A systematic review and analysis of theory in research on gamification, serious games and game-based learning*, identifies 118 learning theories to explain gamification, and through these theories, the authors construct "ten theoretical principles that help explain how gamification works." These principles include clear and relevant goals, guided paths, and adaptive content, among others. These principles aid us in understanding which gamification methods may prove most useful in our study, and so these principles were considered when designing the gamified instruction. However, as with Kapp & Coné's white paper, these assertions are purely theoretical and are not supported by statistical evidence. That said, Krath, Schürmann, & von Korflesch conducted extensive research of prior literature, so some of the research they referenced may contain such statistical evidence.

Mellado & Cubillos' 2024 article, *Gamification improves learning: Experience in a training activity of computer programming in higher education*, is very closely aligned to the study we are conducting. In this study, the authors aimed to determine whether there are differences in learning when learners are provided with gamified instruction versus traditional learning methods. To do this, Mellado & Cubillos conducted a study on computer engineering students at the university level and split the participants between a control group and an experimental group, giving the control group traditional instruction and the experimental group gamified instruction. The results of this study found that "gamification techniques significantly outperformed in learning gains in exercising activities without gamification." Since this study used scoring, leaderboards, and badges as their gamification techniques, we chose to focus our gamified instruction on the "deeper" mechanics mentioned by Kapp & Coné, such as feedback, storytelling, and challenge.

The 2023 study from Qiao et al., *Examining the effects of mixed and non-digital gamification on students' learning performance, cognitive engagement and course satisfaction*, explores the differences between non-digital and mixed (a blend of digital/non-digital) gamification techniques and their effects on learner performance, engagement, and satisfaction. Qiao et al. examined two secondary-grade classes of students and randomly assigned half the participants with non-digital gamified instruction and the other half with mixed gamified instruction. The results of the study showed that the improvement in students' learning achievement was virtually similar between both methods, suggesting that the mode of gamification matters little and that gamification of any modality can improve upon the meeting of learning outcomes.

The 2020 study by Lai et al., compared a gamified approach ("CRUSH Games") to conventional point-of-care ultrasonography (POCUS) training for junior doctors, assessing knowledge and skills at pre-test, post-test, and two months later. While no significant differences in learning outcomes were found, the gamified group reported higher engagement and motivation. Although gamification did not improve knowledge retention or skill development, it enhanced the learning experience, suggesting it could be a valuable complement to traditional methods in increasing learner engagement. This research highlights gamification's potential role in instructional design.

The study by Hamari et al., in 2014 reviews empirical studies on gamification, focusing on its impact on motivation, engagement, and behavior. It presents a framework connecting motivational affordances (e.g., game-like elements) with psychological and behavioral outcomes across 24 studies, revealing that while gamification often yields positive results, its effectiveness depends on the context and user characteristics. The central finding is that gamification can

enhance motivation and engagement, but its success is contingent on factors such as context and personalization. It supports our research on how gamification impacts learner engagement, particularly in educational settings.

This study by Durrani et al., in 2021 compares the effectiveness of gamified flipped classrooms (GFC) and traditional classrooms (TC) in undergraduate management and IT courses at a UAE university. Conducted over six weeks with data from online surveys and focus group interviews, the results show that GFC improves engagement, satisfaction, and motivation, but TC yielded better course outcomes due to perceived content relevance. This suggests that while GFC can enhance certain learning aspects, traditional methods may still be more effective for achieving course objectives. The article is valuable for understanding the impact of different learning methodologies and supports research on blending innovative and traditional pedagogical approaches. Data was collected through surveys and interviews, with quantitative analysis using Mann-Whitney U tests and qualitative analysis for thematic insights.

Zainuddin et al. (2020) conducted a study titled "The Impact of Gamification on Student Engagement and Learning Outcomes in Higher Education: A Meta-Analysis." This meta-analysis covered an extensive range of gamification strategies across various disciplines, such as STEM and humanities. The authors concluded that gamification significantly improves student engagement and learning outcomes, especially when competitive elements such as leaderboards and badges are introduced. Yet they also said that the “impact varied across disciplines; for example, gamification of STEM courses had a more significant influence on improving student retention rate in general when compared to humanities subjects.” Therefore, the study stressed that each application needed to be uniquely tailored with gamification

strategies and content-specific aspects if maximum results were to occur for both student engagement and overall student retention (Zainuddin et al., 2020).

Kim & Lee (2021) investigated narrative and collaboration in gamified learning environments in the article "The Role of Narrative and Collaboration in Gamification: Enhancing Learning Experiences in Online Education." The authors compared two groups of students participating in an online course: one group engaged with gamified content that included strong narrative elements and collaborative tasks, while the other group experienced a more traditional gamified approach without these features. The results indicated that students in the narrative-driven and collaborative gamification conditions were more engaged and satisfied, while their knowledge retention was higher. The authors have argued that embedding narrative and collaborative elements into gamification could give rise to an immersive and meaningful learning experience, yielding better learning outcomes (Kim & Lee, 2021).

Data Collection

This research examines gamified versus traditional methods of instruction on faculty engagement, knowledge retention, and learning outcomes for the University of Tampa. The sample population consisted of 10 UTampa faculty and student employees involved in course development using YuJa. Participants were recruited by email invitation, explaining the purpose of the study, how the research would be conducted, and stating the nature of the volunteer response.

Convenience sampling was used to identify participants familiar with YuJa, ensuring relevance to the research context. Participants were randomly assigned either to the gamified instruction group or the conventional instruction group, with five participants in each. Random assignment was used to minimize bias and ensure comparability between the groups. The control

group received standard written instructions for creating a YuJa video quiz, while the experimental group engaged with gamified content featuring elements such as points, badges, narrative, and interactive feedback mechanisms.

Data collection was done in steps. Immediately after their assigned activity, participants completed an online survey to assess their perceptions of engagement, satisfaction, and learning outcomes. About 1–2 weeks later, a follow-up quiz was administered to measure knowledge retention (however, this time was variable based on participant responsiveness and availability). All surveys and quizzes were administered asynchronously to allow flexibility for participants, and all responses were anonymized and stored in password-protected systems.

To obtain qualitative feedback, optional 10-minute interviews were offered to all participants over Zoom to further delve into their experiences, and at the time of this report's submission, two surveys were completed and documented. The combination of surveys, follow-up quizzes, and interviews was chosen in order to comprehensively address the research questions. The surveys measured engagement and satisfaction, the follow-up quiz measured long-term knowledge retention, and the interviews added depth to the quantitative findings. The survey instruments, including the invitation email, consent form, survey questions, and thank-you email, are detailed in appendix A1 to A4, respectively.

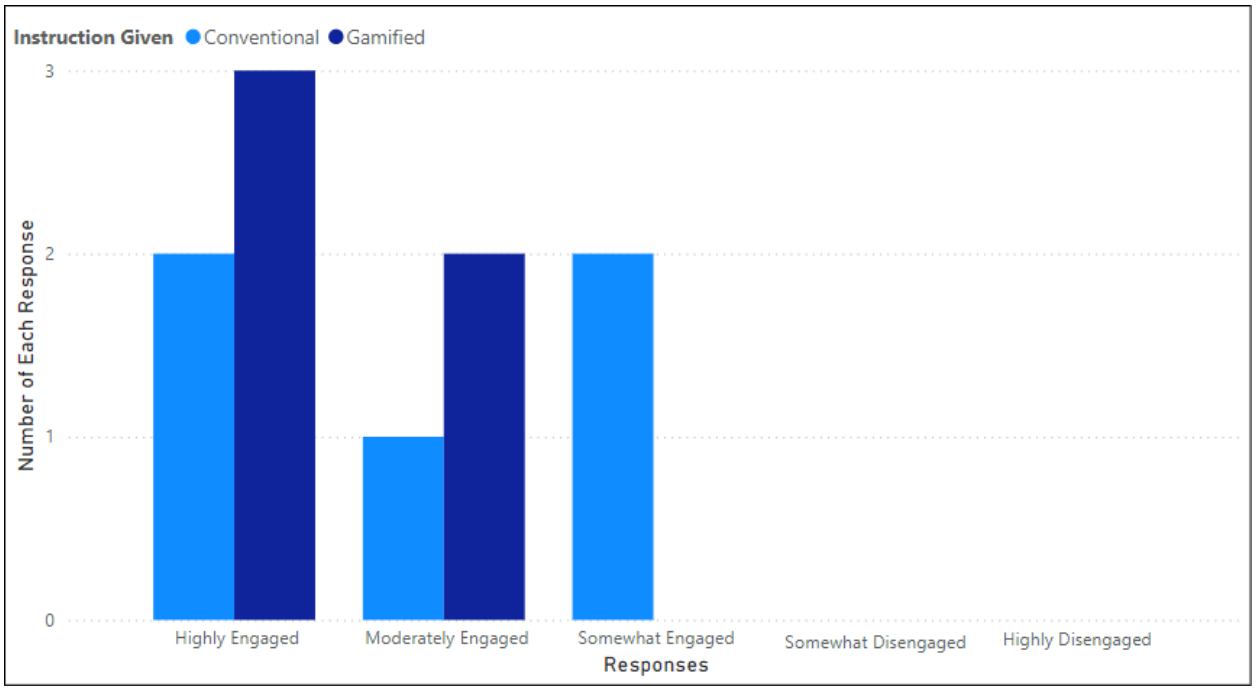
Results

The preliminary findings of the study can be summarized by examining the quantitative data from two survey questions and the results of the final quiz participants were tasked with completing. Each of these data points are shown with the corresponding graphs and subsequently explained.

Quantitative Results

Figure 1

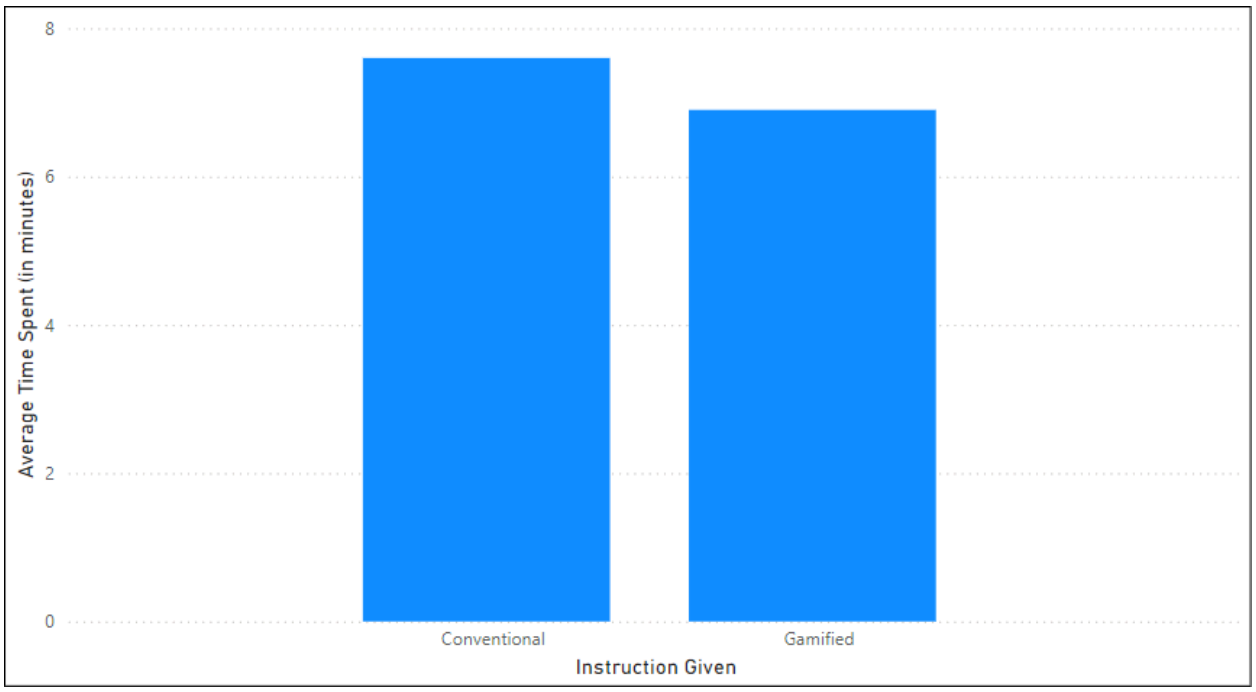
Engagement Level



When asked to report on their own perceived engagement level with the instructional material, three participants who engaged with the gamified activity described their engagement level as “Highly Engaged,” and two others reported their engagement level as “Moderately Engaged.” Of the participants who engaged with the conventional activity, two participants chose “Highly Engaged,” one chose “Moderately Engaged,” and two chose “Somewhat Engaged.” These findings suggest that self-perceived engagement levels are at least equal, if not greater, in gamified instruction versus conventional instruction. This aligns with previous studies in that learning achievement and engagement increase due to gamified instructional methods (e.g., Lai et al., 2020; Qiao et al., 2023).

Figure 2

Activity Completion Time



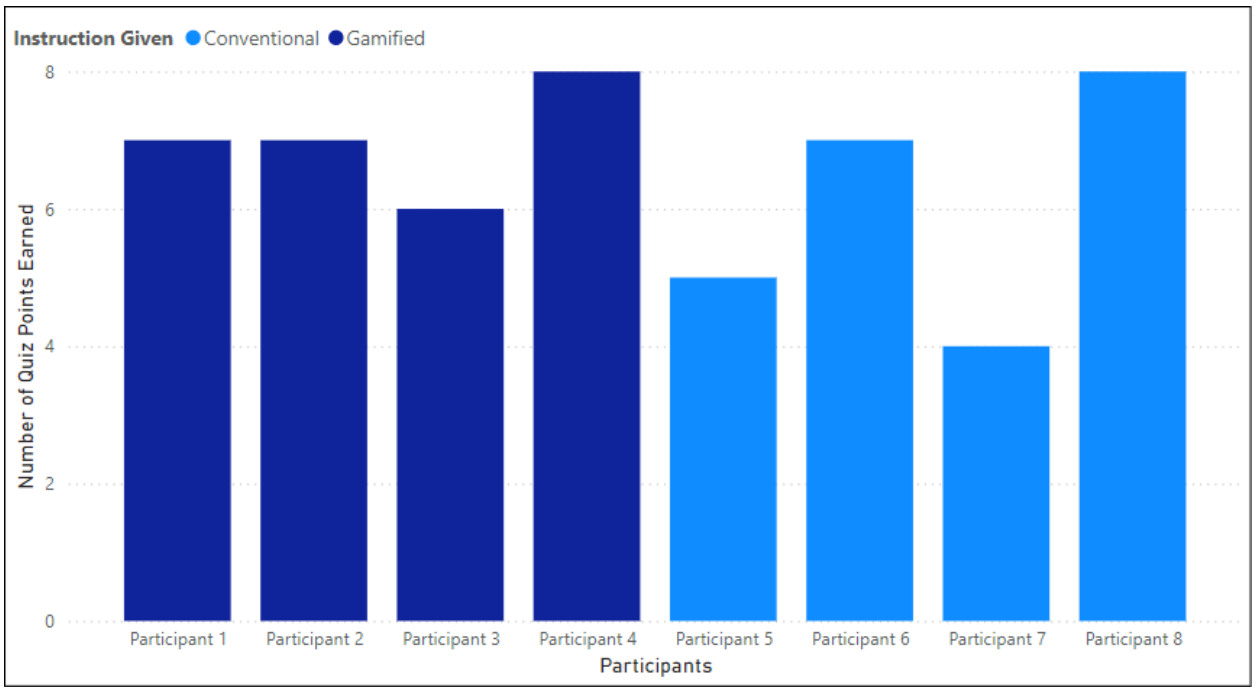
Based on our current level of data collection, the average time spent based on self-reported activity times appears roughly equal between conventional and gamified instructional approaches, with the average time spent on the conventional activity being 7.25 minutes, while the average time spent on the gamified activity was 6.9 minutes.

While our gamified activity, in our internal testing, took approximately 5-10 minutes to complete, participants seemed to spend nearly an equal amount of time with the conventional activity. This may be due to participants re-reading the instructions, which was self-reported in at least two survey responses through written comments.

Though this metric does not necessarily speak to the effectiveness of the instruction, it is worth considering when interpreting other qualitative and quantitative results.

Figure 3

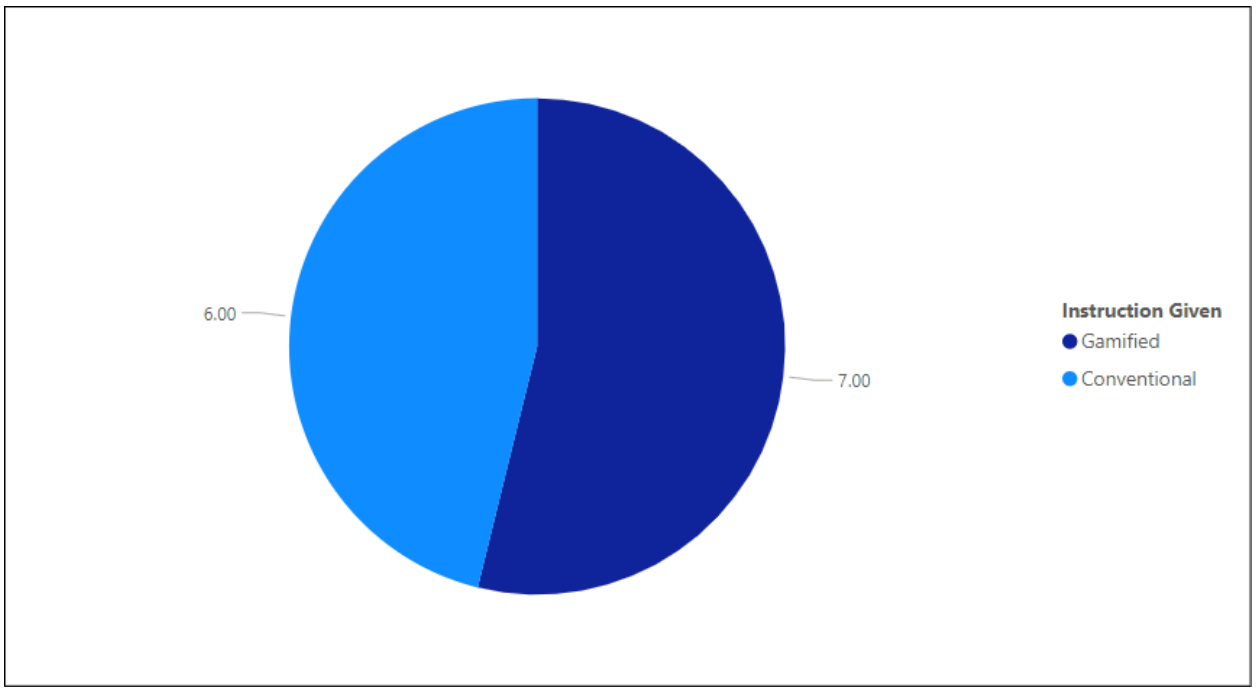
Quiz Scores



Based on the eight participants who submitted a quiz, and out of a possible 10 points, scores reported for participants who received the gamified activity were 7, 7, 6, and 8, while scores for participants who received the conventional activity were 5, 7, 4, and 8. This suggests that gamified instructional strategies can lead to equal or greater knowledge retention than instruction delivered through conventional methods.

Figure 4

Average Quiz Scores



When taking an average of the reported quiz scores, the average score of participants provided with the gamified instruction was 7, while the average score of participants provided with the conventional instruction was 6, again suggesting that knowledge retention for instruction delivered using gamified methods can be higher than retention when compared to conventional methods.

Qualitative Results

Table 1

Comments Regarding Elements Aiding Retention

Instruction Provided	Comments
Gamified	"Using the scroll bar did not work easily for adding answers. Kept getting wrong tone. Also, think the phrasing about initially starting a quiz with title was a bit hard as I went to question box first I think."
Gamified	"The help button was certainly helpful"
Gamified	"It was all very clear!"
Gamified	"Having a voice telling you what to do and guiding you through the platform naturally makes it easier to remember something rather than just reading some instructions or watching a tutorial"
Gamified	"Yes, Help button really helped me to navigate through the course."
Conventional	"actually making a video quiz"
Conventional	"Maybe having a live tutorial to go with the written directions."
Conventional	"The visual element illustrating the steps. I also opened Yuja and walked through the steps while completing the activity. Actually completing the steps helps me retain."
Conventional	"Yes. the instructions with pictures and arrows in them are clear and easy to follow."
Conventional	"I liked the arrows and annotations to figure out where to click."

Note. Question asked was "Do you feel that any specific elements helped you retain information better? Please elaborate."

While the qualitative feedback regarding elements that assisted participants in the domain of knowledge retention was mixed, multiple participants who received the gamified activity mentioned either the help button or the voiceover narration being helpful, which speaks to the element of feedback being crucial to self-reported levels of knowledge retention. Though the qualitative feedback from participants who received the traditional activity do not necessarily speak to gamification elements, feedback surrounding visuals and visual cues suggests that visual feedback is a crucial part of any hands-on instruction.

Table 2

Comments Regarding Elements Aiding Understanding

Instruction Provided	Comments
Gamified	"the ones where you took us through it 2 times and then had us do it on our own...would have been great if you made us start from the beginning and do all steps from finding yuja in Workday again."
Gamified	"The audio guide was so helpful throughout."
Gamified	"Interactive elements that represent the same setup in the real Juja [*sic*] app."
Gamified	"Same as above"
Gamified	"The audio instructions helped me"
Conventional	"clear screen grabs labelled but not too distracting"
Conventional	"The actual pictures showing where to select the different options."
Conventional	"Again, annotated screenshots showing the steps always help me."
Conventional	"The straightforward instructions with images."

Instruction Provided	Comments
Conventional	"Again, the annotations were helpful. Also, the language wasn't too technical."

Note. Question asked was "What specific aspects of the activity (e.g., any interactive elements, images) did you find most useful in supporting your understanding of the content?"

Qualitative feedback from participants who received the gamified activity surrounding which elements aided in understanding of the learning content again point to the feedback mechanisms as being most helpful, further suggesting that feedback is an important element in both knowledge retention and comprehension. Feedback from participants who received the traditional activity centralized on the visuals and visual cues once again, which also suggests that clear visual elements are perceived as valuable no matter the mode of instruction.

Table 3

Comments Regarding Elements Aiding Motivation

Instruction Provided	Comments
Gamified	"response noise was great. Colors engaging."
Gamified	"I felt the badges and celebration gifs were too attention seeking"
Gamified	"It is pretty engaging. Though I felt that some activities are very intuitive to navigate and may not need this many detailed instruction. In other words, you can probably shorten the tutorial a bit."
Gamified	"I would say it aroused more curiosity than a tutorial"
Gamified	No response given
Conventional	"Looks easy, look forward to using it"

Instruction Provided	Comments
Conventional	"I did not have an activity elements. But that would have been helpful."
Conventional	"Again, the visual illustration prompted me to open the application and follow along with the steps. I am much more motivated if I can actually engage in the activity. It was also concise and straightforward. I stay super busy, so when something is concise and on point, I am more motivated to engage."
Conventional	"Experiencing this has really motivated me to learn more about this and apply this to my teaching courses in the near future."
Conventional	"I was motivated to learn more about the sequence."

Note. Question asked was "How did the activity elements affect your motivation to participate? Please explain."

When it comes to motivation, qualitative feedback from participants who received the gamified activity seemed less focus than in previous questions. Where feedback was given, it seems to speak to participants' overall feelings about the activity as opposed to answering specifically how the activity elements affected their motivation to participate. Interestingly, one participant who received the conventional activity stated they think having interactive elements would have been helpful, despite not being told there was another version of the activity.

Discussion and Recommendations

These findings represent key messages from this study regarding the impact of gamified versus traditional instructional methods on faculty learning outcomes, engagement, and knowledge retention. Based on our current level of data collection, our analysis suggests that, although both instructional methods were effective in enabling participants to complete the task

of creating a YuJa video quiz, the gamified instructional methods appear to elicit equal or greater levels of self-reported engagement levels compared to traditional instruction. The participants in the gamified group reported increased motivation, a sense of achievement, and a more immersive learning experience, which also aligns with previous studies (e.g., Lai et al., 2020; Qiao et al., 2023).

Similarly, the results of the follow-up quiz indicate similar findings in terms of knowledge retention for both groups, with equal-to-slightly-higher levels of knowledge retention for participants who received the gamfied instruction versus those who received the traditional instruction. These results imply that gamification enhances the learning experience but does not truly translate into superior long-term retention compared to traditional approaches. This supports studies by Hamari et al. (2014), which explain that while gamification enhances engagement, its influence on retention is variable depending on context.

Qualitative feedback from survey and interview data also showed that specific game elements, such as points, feedback, and challenges, were influential for fostering engagement but remain less clear regarding how they enhance knowledge retention. The framing narrative and interactive task features seemed to be the most salient elements for keeping learners invested in the gamified experience, though further research may be necessary to investigate how these elements might directly impact knowledge retention.

Implications

This research holds significant potential implications for instructional design practices and faculty training programs. By investigating whether gamified methods improve engagement and learning outcomes, the findings could inform best practices for integrating gamification into faculty development initiatives. If gamification is found to be effective, it may encourage higher

education institutions to adopt similar strategies to enhance faculty and student employee satisfaction and training success. Moreover, the study will contribute to the growing literature on gamification in education, particularly in the context of higher education and faculty training, potentially inspiring further research in similar domains.

Limitations

Several limitations might have affected the outcomes and results of this study. First, the sample size is small, with 10 participants, hence limiting the generalization of the findings to a larger population of faculty members or student employees. Convenience sampling also means that there is a high risk of selection bias, as participants who are already familiar with YuJa may not be representative of a diverse faculty and student demographic. Moreover, reliance on self-reported survey data introduces the potential for social desirability bias, in which participants answer questions with responses they perceive as favorable or desirable. The timing of the follow-up quiz could also influence retention results, as external factors during the interim period may impact memory or performance. By addressing these limitations, the study design could be refined to produce more robust and generalizable findings. While these limitations do not invalidate the results, they do point out areas that could be improved in future research.

Future Research Suggestions

Based on the findings and limitations of this study, a number of avenues for future research emerge. A larger, more diverse sample, including participants from various departments and institutions, is needed to enhance generalizability and provide a broader perspective on gamified instruction across disciplines. Moreover, although the present study has focused on short-term retention, future research should investigate longer-term retention and the transfer of

knowledge into practice—for example, job performance—to further establish the practical efficacy of gamified learning. Research can also be expanded by including a randomized sampling strategy and participants with different levels of familiarity with the technology. Moreover, this research focused only on the specific game elements of points, feedback, and challenge, whereas future studies could investigate other game mechanics that might impact learning outcomes, such as leaderboards or collaboration. A comparison of gamified instruction in online, hybrid, and face-to-face learning environments would also serve to provide information on how contextual factors influence its effectiveness. Finally, extending research to multiple disciplines and teaching tools will allow for the determination of whether the gamification effects are consistent among academic fields and course types.

Ethical Considerations

The study was designed to adhere to strict ethical standards. Informed consent was obtained from all participants before their involvement, with detailed information provided on the study's purpose, procedures, risks, and voluntary nature. Participants were assured of their right to withdraw at any time without penalty. Data collection processes prioritized anonymity, with no identifying information linked to survey or quiz responses. All data was securely stored in a password-protected environment and will only be used for research purposes. Additionally, audio recordings from interviews are anonymized and deleted following transcription and analysis. The study involved minimal risk, as activities were non-invasive and unlikely to cause any harm or discomfort to participants. IRB approval ensures that all ethical considerations have been thoroughly reviewed and addressed prior to initiating the study.

Conclusion

Based on the data collected thus far, our research suggests that gamified instructional approaches lead to equal or greater-than levels of knowledge retention and self-reported engagement levels. Additionally, based on the qualitative feedback collected, immediate feedback seemed to be the most effective element, with participants citing the help button, guided voiceover, and visual hints being the most helpful elements which aided their knowledge retention and overall engagement.

While further research can and should be conducted to expand the participant pool across disciplines and tracking knowledge retention beyond a 1-2 week window, these preliminary findings seem to agree with the current literature that gamified instruction leads to overal gains in the areas of knowledge retention, engagement levels, and the overall ability of the instruction to meet the stated learning objectives.

References

Durrani, U. K., Naymat, G. A., Avoubi, R. M., Kamal, M. M., Hussain, H. (2021, December 28). *Gamified flipped classroom versus traditional classroom learning: Which approach is more efficient in business education?*. The International Journal of Management Education. https://www.sciencedirect.com/science/article/pii/S1472811721001440

Hamari, J., Koivisto, J., & Sarsa, H. Does gamification work? -- A literature review of empirical studies on Gamification | IEEE conference publication | IEEE Xplore. (2014, March 10). https://ieeexplore.ieee.org/document/6758978/

Kim, S., & Lee, Y. (2021). The role of narrative and collaboration in gamification: Enhancing learning experiences in online education. *Educational Technology Research and Development*, 69(5), 1251-1272.

Kapp, K & Coné, J. (2012). What every chief learning officer needs to know about games and gamification for learning. *Department of Instructional Technology and Institute for Interactive Technologies*. https://karlkapp.com/wp-content/uploads/2013/01/clo_gamification.pdf

Krath, J., Schürmann, L., & von Korflesch, H. F. O. (2021). Revealing the theoretical basis of gamification: A systematic review and analysis of theory in research on gamification, serious games, and game-based learning. *Computers in Human Behavior, 125*, 106963. https://doi.org/10.1016/j.chb.2021.106963

Lai, A. K. H., Noor Azhar, A. M. B., Bustam, A. B., Tiong, X. T., Chan, H. C., Ahmad, R. B., & Chew, K. S. (2020, August 12). *A comparison between the effectiveness of a gamified approach with the conventional approach in point-of-care ultrasonographic training*. BMC medical education. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7425000/

Mellado, R., & Cubillos, C. (2024). Gamification improves learning: Experience in a training activity of computer programming in higher education. *Journal of Computer Assisted Learning*, 40(4), 1959–1973. https://doi.org/10.1111/jcal.13000

Qiao, S., Yeung, S-s., Zainuddin, Z., Ng, D. T. K., & Chu, S. K. W. (2023). Examining the effects of mixed and non-digital gamification on students' learning performance, cognitive engagement and course satisfaction. *British Journal of Educational Technology*, 54, 394–413. https://doi.org/10.1111/bjet.13249

Zainuddin, Z., et al. (2020). The impact of gamification on student engagement and learning outcomes in higher education: A meta-analysis. *Educational Psychology Review*, 32(2), 249-275.

Appendix A

Survey Instruments

Invitation Email

Subject: Invitation to Participate in Research Study titled Assessing Learning Outcomes in Gamified vs. Conventional Approaches

Dear [Participant Name],

We hope this message finds you well! We, Nick Chevalier & Pooja Potdar, graduate students in the IDT program at the University of Tampa are excited to invite you to participate in a unique instructional activity designed to explore the effectiveness of gamified versus traditional teaching methods.

Study Overview: This activity is part of our research project (a requirement for our graduate course, EME 603: Inquiry and Measurement) analyzing [faculty or student employee] perceptions of instructional methods at UTampa. As a [faculty member or student employee] involved in course development, your experience with instructional activities will help us understand the impact of different teaching methods.

Activity Details:

- **Date & Time:** Please complete all activities by no later than November 30, 2024 at 11:59pm ET
- **Location:** any, using your own internet-connected device
- **Duration:** Approximately 15-20 minutes for the initial activity, 5-10 minutes for the survey

To begin, please follow the link below to access the instructional activity:

[Game Link or Written guide Link]

Please find the **attached consent form** for your review before participating in the activity. After completing the activity, you will receive a link to a brief online survey to share your thoughts on the experience.

If you would also like to participate in a brief (no longer than 10 minutes) interview via Zoom to discuss your experience in the study, please feel free to let us know so we can schedule a time.

Confidentiality: Rest assured that all responses will remain confidential and will be used solely for research purposes.

If you have any questions or need assistance during the game, please feel free to reach out.

Thank you for your participation!

Best regards,

Nick Chevalier

Student | IDT Program

nchevalier@ut.edu

The University of Tampa

Pooja Potdar

Student | IDT Program

poojaravindra.potdar@spartans.ut.edu

The University of Tampa

Appendix B

Informed Consent

INFORMED CONSENT

THE UNIVERSITY OF TAMPA

Project Title: Assessing Learning Outcomes: Gamified vs. Conventional Approaches

Principal Investigator: Nick Chevalier, nchevalier@ut.edu, Graduate Student

Co-Investigators: Pooja Ravindra Potdar, poojaravindra.potdar@spartans.ut.edu, Graduate Student; Dr. Minkyoung Kim, mkim@ut.edu, Assistant Professor

Purpose of Project: This study aims to gather insights into faculty experiences with these instructional approaches, focusing on engagement, knowledge retention, and overall learning outcomes.

Procedures: Participants will be asked to complete an online survey. The survey will include questions regarding participants' experiences with gamified and traditional instructional methods, as well as their perceptions of their effectiveness. This survey will take approximately 10-15 minutes to complete and will be conducted following participation in either a gamified or conventional instructional activity.

Participants will also be invited to participate in a brief (no longer than 10 minutes) interview via Zoom to discuss their experience in the study. The data from this interview will be collected via a Zoom audio recording and all responses will be de-identified to ensure confidentiality.

Risks/Benefits: This study provides no risk to participants in terms of physical, psychological, or social risk. The benefit to participants includes the knowledge of how to create a YuJa video quiz, which is a task many faculty or student employees may need to take anyway during their course design and/or course facilitation. No other benefits are being offered.

Confidentiality: Data collected for this study will be confidential. Only the principal investigator and co-investigators will have access to the data files. The participants will sign the consent from identifying them as participants, but all data will be securely stored in a password-protected electronic format and used solely for research purposes.
This data will not be used or distributed for future research studies even if identifiers are removed.

CONDITIONS OF PARTICIPATION

Participating in this project is voluntary, and refusal to participate or withdrawing from participation at any time during the project will involve no penalty or loss of benefits to which the subject is otherwise entitled. The principal investigator may terminate participation of a subject or the project entirely without regard to the subject's consent. In the event of questions or difficulties of any kind during or following participation, the subject may contact the Principal Investigator as indicated above.

CONSENT

I have read the above information and my questions and concerns, if any, have been responded to satisfactorily by project staff. I believe I understand the purpose, benefits, and risks, if any, of the study, and give my informed and free consent to be a participant.

_____ _____

SIGNATURE DATE

THIS RESEARCH PROJECT HAS BEEN APPROVED BY THE INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS OF THE UNIVERSITY OF TAMPA (Phone: 813-253-3333)

Appendix C

Survey Questions

Survey Title: Assessment of Learning Outcomes: Gamified vs. Conventional Instruction

Introduction

Thank you for participating in our research study on faculty perceptions of instructional methods. As a faculty member involved in course development at the University of Tampa, you are invited to complete a brief online survey about your recent instructional activity experience. All responses will be kept confidential and used solely for research purposes to enhance our understanding of gamified versus traditional instructional methods and their impact on learning outcomes. If you have any questions before we begin, please feel free to ask.

Survey Questions:

1. Did you experience any issues completing or accessing the activity?
2. Were any of the steps or instructions in the activity difficult or unclear to follow? If so, please describe which parts and explain why they were challenging.
3. How would you describe your engagement level with the activity? (e.g., highly engaged, moderately engaged, somewhat disengaged, etc.)
4. Do you feel that any specific elements helped you retain information better? Please elaborate.
5. What specific aspects of the activity (e.g., any interactive elements, images) did you find most useful in supporting your understanding of the content?
6. How did the activity elements affect your motivation to participate? Explain.
7. Approximately how much time did it take you to complete the activity?
8. Do you have any additional comments about the instruction? *(Open-ended response)*

Appendix D

Thank you Email

Subject: Thank You for Your Participation!

Dear [Faculty Member's Name],

We sincerely appreciate your time and feedback on our research study! The information collected is for research purposes as part of a requirement for our graduate course, EME 603: Inquiry and Measurement. Our goal is to explore faculty perceptions regarding the effectiveness and impact of gamified versus conventional instructional methods on learning outcomes.

Your insights are invaluable and bring us one step closer to achieving our research goals. Thank you for your valuable participation!

If you have any final questions or thoughts about this study, please feel free to reach out to Nick or Pooja. If you think of anything later, don't hesitate to reach out.

Thank you once again for your support!

Best regards,

Nick Chevalier

Student | IDT Program

nchevalier@ut.edu

The University of Tampa

Pooja Potdar

Student | IDT Program

poojaravindra.potdar@spartans.ut.edu

The University of Tampa

Appendix E

Quantitative Survey Results

Figure E1

Engagement Level

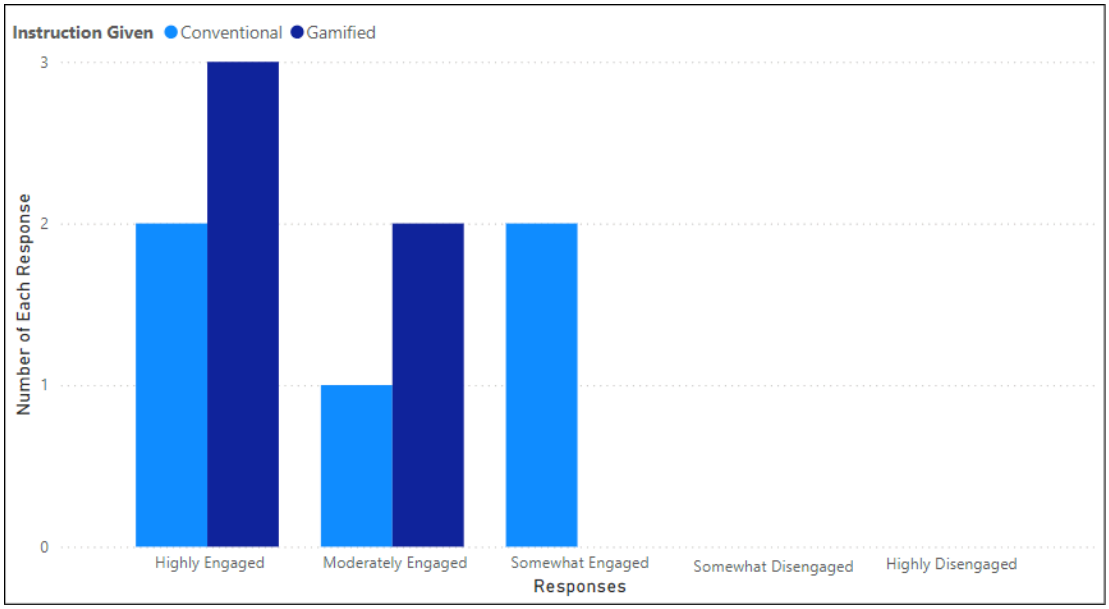


Figure E2

Activity Completion Time

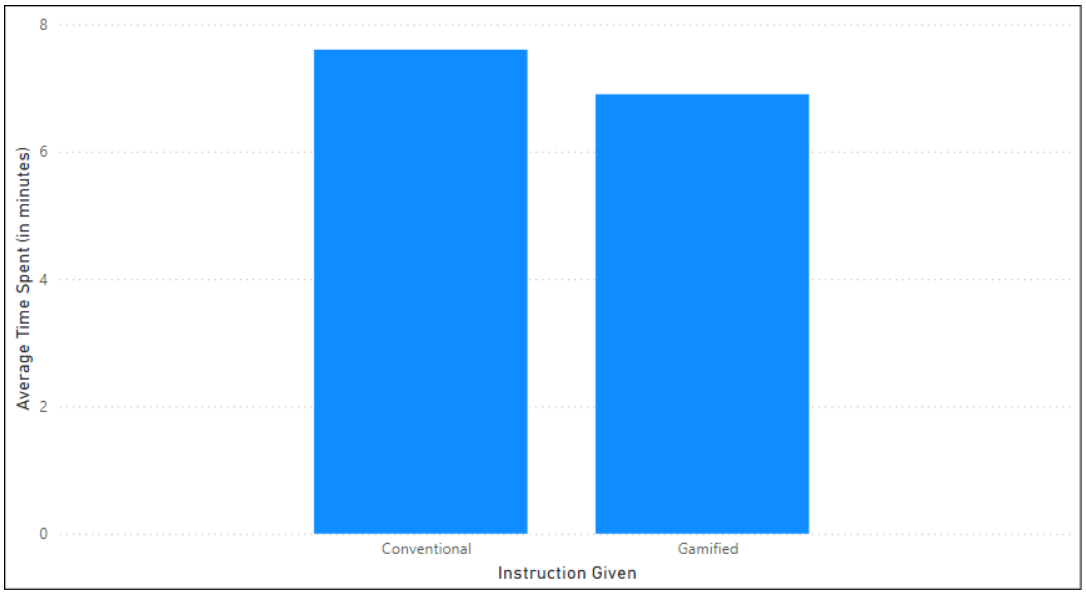


Figure E3

Quiz Scores

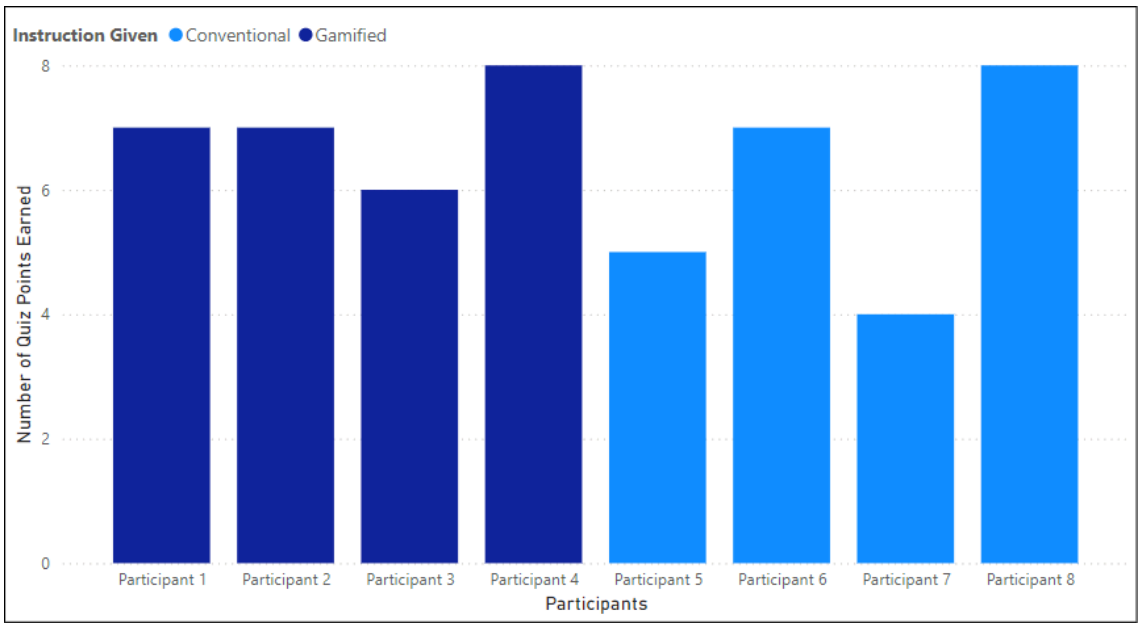
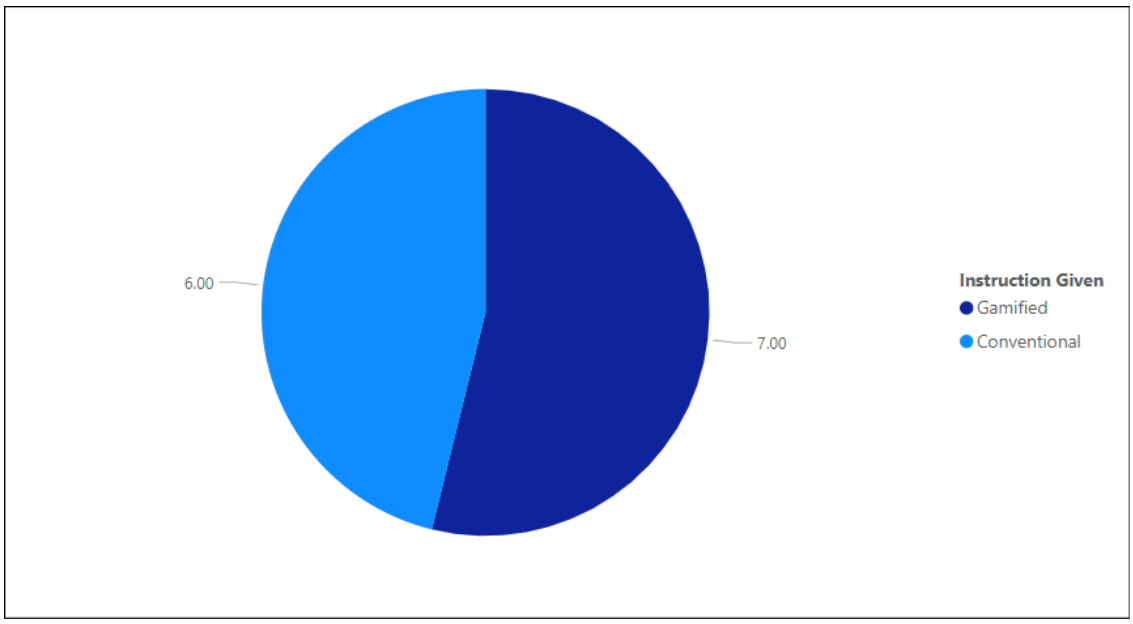


Figure E4

Average Quiz Scores



Appendix F

Qualitative Survey Results

Table F1

Comments Regarding Elements Aiding Retention

Instruction Provided	Comments
Gamified	"Using the scroll bar did not work easily for adding answers. Kept getting wrong tone. Also, think the phrasing about initially starting a quiz with title was a bit hard as I went to question box first I think."
Gamified	"The help button was certainly helpful"
Gamified	"It was all very clear!"
Gamified	"Having a voice telling you what to do and guiding you through the platform naturally makes it easier to remember something rather than just reading some instructions or watching a tutorial"
Gamified	"Yes, Help button really helped me to navigate through the course."
Conventional	"actually making a video quiz"
Conventional	"Maybe having a live tutorial to go with the written directions."
Conventional	"The visual element illustrating the steps. I also opened Yuja and walked through the steps while completing the activity. Actually completing the steps helps me retain."
Conventional	"Yes. the instructions with pictures and arrows in them are clear and easy to follow."
Conventional	"I liked the arrows and annotations to figure out where to click."

Note. Question asked was “Do you feel that any specific elements helped you retain information better? Please elaborate.”

Table F2

Comments Regarding Elements Aiding Understanding

Instruction Provided	Comments
Gamified	“the ones where you took us through it 2 times and then had us do it on our own...would have been great if you made us start from the beginning and do all steps from finding yuja in Workday again.”
Gamified	“The audio guide was so helpful throughout.”
Gamified	“Interactive elements that represent the same setup in the real Juja [*sic*] app.”
Gamified	“Same as above”
Gamified	“The audio instructions helped me”
Conventional	“clear screen grabs labelled but not too distracting”
Conventional	“The actual pictures showing where to select the different options.”
Conventional	“Again, annotated screenshots showing the steps always help me.”
Conventional	“The straightforward instructions with images.”
Conventional	“Again, the annotations were helpful. Also, the language wasn't too technical.”

Note. Question asked was “What specific aspects of the activity (e.g., any interactive elements, images) did you find most useful in supporting your understanding of the content?”

Table F3

Comments Regarding Elements Aiding Motivation

Instruction Provided	Comments
Gamified	"response noise was great. Colors engaging."
Gamified	"I felt the badges and celebration gifs were too attention seeking"
Gamified	"It is pretty engaging. Though I felt that some activities are very intuitive to navigate and may not need this many detailed instruction. In other words, you can probably shorten the tutorial a bit."
Gamified	"I would say it aroused more curiosity than a tutorial"
Gamified	No response given
Conventional	"Looks easy, look forward to using it"
Conventional	"I did not have an activity elements. But that would have been helpful."
Conventional	"Again, the visual illustration prompted me to open the application and follow along with the steps. I am much more motivated if I can actually engage in the activity. It was also concise and straightforward. I stay super busy, so when something is concise and on point, I am more motivated to engage."
Conventional	"Experiencing this has really motivated me to learn more about this and apply this to my teaching courses in the near future."
Conventional	"I was motivated to learn more about the sequence."

Note. Question asked was "How did the activity elements affect your motivation to participate? Please explain."