

Increasing Student Motivation and Awareness Towards Career Opportunities Through Gamification

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Abstract: Student engagement is important to ensure success towards their desired career opportunities (High and Andrews, 2009). Students engage with their coursework to receive the necessary grades to avoid failure (Covington, 1999). Failure can indicate a disbelief in their abilities, therefore engagement with assignments becomes a zero sum game (Middleton and Perks 2014). The results from a 2012 survey in America stated that 87.9% of the students attended college in order to receive better career opportunities (Astin et al., 2012). Intercept interviews consisting of 8 students also indicated that career opportunities are the end goal and main motivator for engagement with course modules but the relevance of some modules can be unclear to the student which decreases engagement levels with that subject. Because of this, the student may not develop the particular skillsets necessary to achieve their desired career choice. A limited awareness of career choices and what skills they require have been identified as problem areas from the interviews. To help students engage with their studies and achieve their desired career choice, students require constant feedback that is relevant to each of their identity-related needs. The development of a system that focuses on these needs may provide a clear path outlining what skillsets are necessary for each career choice and how to build them. This study utilizes gamification, the use of game elements in a non-game context, to address student needs and to answer the following research question: *To what degree can a gamification system help increase student engagement and what effect do particular elements have on the user's engagement?* The approach used for this study was human-centred design to develop a gamified system that focuses on the needs of the student while delivering an engaging experience. A low-fidelity prototype has been developed which focuses on developing skillsets relevant to real world jobs. The prototype has gone through user testing using the think aloud protocol. The users were interviewed to allow them to reflect back on their experience and provide feedback for the next iteration of the system.

Keywords: Gamification, Awareness, Engagement, Motivation, Careers

1. Introduction

Students interact with many online interfaces during their study. Some of these interfaces supply learning materials, some function as a means of completing assignments, and others are used to communicate. These interfaces include email, online storage options and Learning Management Systems (LMS). Blackboard Learn is an example of a LMS used by Colleges and Universities around the world (Uki.blackboard.com, 2015). Blackboard Learn focuses on providing a platform that can be accessed anywhere, both on a computer and on mobile platforms. It allows for collaboration and access to assignments and learning resources. Blackboard Learn does not offer features that allow students the ability to explore the opportunities available to them as they progress through their college course. The system does not provide a connection between the skillsets the students are learning in college and the real world skills needed in the professional field. The ability to construct meaning while using Blackboard Learn is lost, therefore it becomes another tool that the student may or may not use among a large selection of tools available to them. Despite Blackboard being touted as an easy-to-use system, students find there is a learning curve that takes a lot of time and often run into problems while using the system (Bradford et al., 2007). Blackboard Learn relies on notifications to encourage student engagement (Uki.blackboard.com, 2015). However notifications can be perceived as an interruption and cause stress and annoyance depending on how they are distributed (Pielot, et al., 2014). Therefore, Blackboard Learn's methods of engagement can be poorly received.

People engage with an activity because they wish to. The activity becomes work once they have to do it (High and Andrews, 2009). Students will engage with their study once they make a connection between what they are learning and how it benefits their future (High and Andrews, 2009). This engagement can be dramatically swayed when students are praised for their abilities instead of their efforts (Middleton and Perks, 2014). Even

high graded students disengage with their studies once a task is challenging and seems too difficult compared to their current ability level. Failure becomes “an indication that their belief in their abilities was not accurate” (Middleton and Perks, 2014). The problem area here is that student engagement with assignments becomes a zero sum game (Middleton and Perks, 2014).

The next section of this paper examines existing studies and systems related to the research area followed by the approach, which demonstrates the methods and influences for the study. This is followed by a description of the prototype, which was designed from the approach section along with the study and results of user testing with the prototype. The paper finally concludes with the discussion of how the prototype demonstrates itself as a tool for students and what future studies will take place. This study utilizes an initial prototype with the results of the study informing design decisions for a working prototype to be used in a future study.

2. Literature Review

Growth Engineering’s Academy LMS, utilises gamification to make learning more fun and drive behavioural change on an individual and organisational level (Growth Engineering, 2015). Gamification is a technique used to encourage engagement and introduce fun into activities that are considered difficult or boring to engage with. The technique applies game elements, like points and levels, into areas that are non-game based. The Academy LMS uses points, badges, levels and leader boards as well as social learning as key features of creating fun learning. The game elements have shown to increase engagement and maintain the attention of new learners (Growth Engineering, 2015). Gamification is being used on many online learning services to increase engagement. Codecademy, for example, is an online education system that teaches programming languages like HTML and Javascript (Codecademy, 2015). It maintains student engagement through rewarding points and badges for course completions. These badges offer feedback that rewards the student for completing a task. Unlike grades, points and badges are milestone achievements, congratulating the student for their efforts and progress, not just for the finished assignment. Codecademy uses gamification to create an engaging learning experience and provides a clear sense of accomplishments and goals. Codecademy reinforces their learning material by providing short video clips and written articles by successful programmers who have used Codecademy to learn. These resources are not only important in encouraging student engagement but also provide a focus as to why the student is learning and how this material can benefit them.

Gamification shows a lot of promise in increasing student engagement but very few systems use game elements to increase student awareness towards career opportunities and how to prepare for them. Me Tycoon was an online social game to help young people explore career opportunities and learn how to manage finances. The results from the game showed that 92% of students discovered new jobs they had not considered before (PlayGen, 2016). Unfortunately, Me Tycoon is no longer available but demonstrated a very high percentage of students that benefitted from playing the game. There is huge potential in creating a gamified system that focuses on the needs of students towards career choice and how to prepare for them.

3. Approach

Human-centred design was used for this study to develop a gamified system that addresses the needs of students and delivers an engaging and fun experience while they attend their studies. Human-centred design is an iterative process, which focuses on a small sample of between six and twenty users (Kujala and Kauppinen, 2004). Each prototype developed from the findings of the research enters a feedback loop that informs the next design iteration. The process was repeated until a prototype was ready for user testing.

The first stage of the process is to empathize with the user through observation and engagement. Understanding how a user overcomes challenges and how they approach activities in the context of the design challenge is fundamental to human-centred design. Engaging with the potential users uncovers findings that may not have been obvious even to the user themselves. This provides a new way of approaching the design by stepping into the shoes of the users.

Lots of information becomes available through empathising and bringing the information together helps focus on the important findings. This leads into the next stage of Defining the Problem. Defining the problem helps focus and frame the project. It provides a point-of-view that makes sense of the synthesized information.

The next stage of human-centred design is the ideation process. This is where the concepts are generated for the creation of prototypes. Prototypes can act as a means to communicate the ideas before generating a user-testing prototype. The ideation phase helps create solutions from the problems identified from the POV. Prototyping allows for conversations and interactions with users not possible through interviewing or surveying. Through making low fidelity prototypes, user testing can be cheap and failure of the prototype won't affect time or resources.

Each prototype goes through a user testing process. The feedback received during this process allows for refinements and solutions. User testing can also aid with empathy. Closely observing how the user interacts with the prototype provides further insight that may not have been revealed earlier in the study. Testing may also in fact show that the POV was framed incorrectly. The findings can then feed back into the design where the process can be repeated.

3.1 Empathy and Problem Statement

Empathy was established with the students through intercept interviews. These interviews provided an understanding of how the students overcome challenges and how they approach activities in the context of the design challenge. The interviews were conducted consisting of eight students between the age of 19 and 25. Two of the students were studying Visual Communications and Design while the other six students were studying Computer Games Development at IT Carlow, Ireland. Each student was asked the following question:

How do you manage to stay motivated and engaged through college?

Each interview took no longer than 5 minutes with the question focusing on how the student approaches assignments and what tools they may have used to complete them. A recurring point from the interviews was that the students were motivated to complete assignments in order to achieve the necessary grade to apply for jobs in the professional field. As this was a major long-term motivation for the students, using game elements that focus on constructing meaning behind each assignment and skillset has the potential to increase engagement and help students achieve their goal. The results from the interview concluded with the following problem statement:

Students feel that some modules offer skillsets they won't need in order to apply for future jobs. Completing those modules creates annoyance and stress, leading to demotivation towards all areas in the course. Some sort of tool, which addresses the students' needs and constructs meaning behind each skillset they learn may reduce a lot of these pressures and increase motivation.

Career opportunities are a very important deciding factor and motivator for why students attend college. A 2012 survey published in *The American Freshman: National Norms Fall 2012* demonstrated that students attended college to earn better career opportunities and that this motivation to attend is increasing and, at the time of the survey, was at an all time high (Astin, et al., 2012). The survey was conducted with 192,912 students across 283 colleges and universities in the United States. This motivator increased from 85.9% in 2011 to 87.9% in 2012 (Figure 1). The survey was conducted again in 2015 demonstrating that 85.2% of students attend college for the opportunity of a better career (Eagan et al., 2016). This survey has been conducted every year since 1976 with the motivation to receive education showing an equal percentage with the motivation for a better job in the years 1976 and 1977. But since 1978 the latter remained the main motivator.

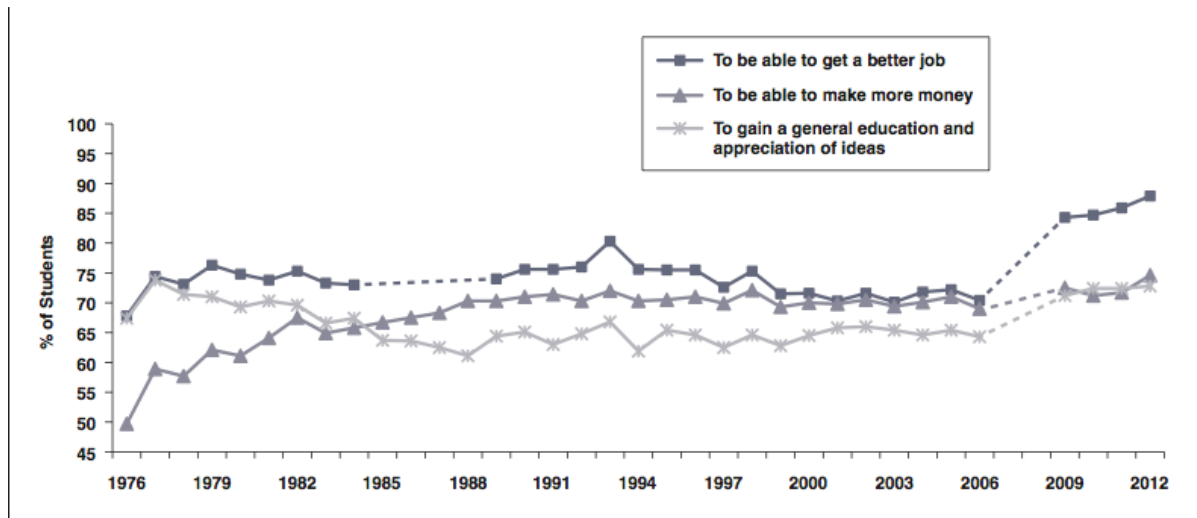


Figure 1: Trends in deciding factors to attend college (Astin, et al., 2012)

3.2 Ideation

Games themselves are engaging because they are fun (Werbach, 2015). By studying the fun factors of games and applying them to a learning environment, may help engage students in learning skills that aid them towards job opportunities.

Richard Bartle’s player types (Bartle, 1999) provide a model that aids in understanding the individual motivators as to why a player wishes to play a particular game (Figure 2). Understanding these motivators is key to providing a fun experience for all player types.

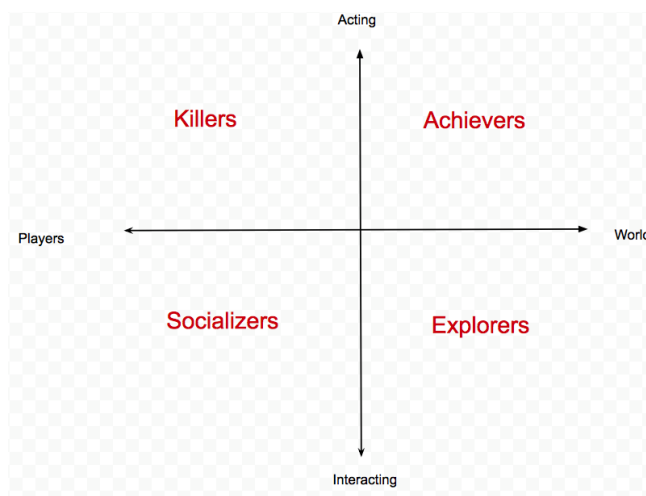


Figure 2: Bartle’s Player Types

Bartle’s player types are based on the motivations of players and what they wish to receive from playing a Multi-User Dungeon (MUD) game. The player types are divided into four categories;

- *Achievers* – ACT on the WORLD. Achievers play the game to win. They like to set out goals in order to achieve them.
- *Explorers* – INTERACT with the WORLD. Explorers enjoy exploring the game world and physics and delight in doing so.
- *Socializers* – enjoy INTERACTING with other PLAYERS. Socializers enjoy chatting with other players and empathize with them.
- *Killers* – enjoy ACTING on other PLAYERS. Killers enjoy causing distress for other players by using the tools of the game against them.

Bartle states that many players will lean into each category but in the case of playing a MUD, the player will have a particular category preference (Bartle, 1999). But game motivations change depending on the mood of the player or the type of game they are playing. A player may wish to interact with the world and explore when playing *Myst* (Cyan Inc., 2016) or the same player may wish to interact with other players and socialize in *Destiny* (Bungie, 2016). Player types change from moment to moment similarly to student learner types. These types change based on what John Falk refers to as small-identity needs (Statens Kunstfond, 2013).

Falk's small-identity needs are based in the context of a physical learning environment, a museum. These are identities that are situated in the moment. Falk argues that small identities are more beneficial to understanding one's motivation to learn rather than big identities (demographic information such as age, nationality, sex) (Statens Kunstfond, 2013).

Falk's identity-related motivations are as follows;

- *Explorer* - an exploring visitor attends to satisfy their curiosity.
- *Facilitator* - a facilitator attends with a child or partner to help satisfy their needs.
- *Tag-Along* - these types of visitors are dragged along by another, they are motivated to please others.
- *Experience Seeker* - motivated by desire to see and experience a new environment.
- *Professional/hobbyist* - motivated by specific knowledge-related goals or the desire to satisfy content-related objectives.
- *Recharger* - a recharger is motivated by having a contemplative or restorative experience.

To develop a gamified system that accommodates for learner types that change based on small-identity needs, all player types need to be considered. By comparing Falk's results with Bartle's player types, we can see similarities between both types of engagers and how student learning can accommodate for a gamified learning experience (Table 1). The killer player type, although possibly necessary in a game, may not be a motivational characteristic in a learning environment as there is no learning motivator in Falk's model for that player type. These small-identity needs became the personas for which the low-fidelity prototype was designed.

Falk	Bartle
Explorer	Explorers
Facilitators	Socialisers
Tag-Along	Socialisers
Experience Seeker	Explorers
Professional/hobbyist	Achievers
Recharger	Explorers

Table 1: Falk's learner types and Bartle's player types comparison

3.3 Prototype

The prototype offers the student to see the skillsets they learn per assignment and how they are applied in the professional field. The prototype is a game consisting of a workplace, populated by offices and characters. Each office contains a job opportunity and colleagues to interact with (Figure 3).

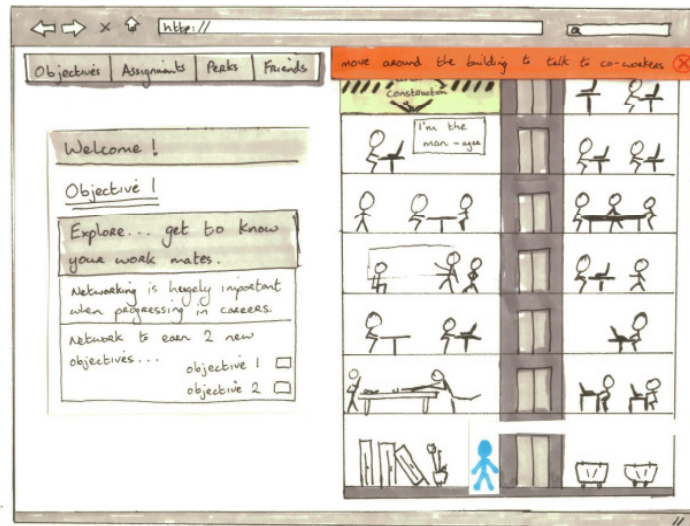


Figure 3: Gamified system prototype, main screen

The student is represented by an avatar and can progress in careers through completing tasks and networking. The job positions require the student to have obtained skillsets relevant to the real world job. To the left of the game, is a dashboard that allows students to interact with friends, view statistics and upload assignments. The student uploads their college assignments using this dashboard and upon review, is rewarded with skillsets achieved from the assignment and a new job position becomes available to the student in the game. Through this comparison, progress can be rewarded and can reinforce the path and skills required for career opportunities. To help the student in managing assignments, all work and progress is tracked through the system. This informs the student on which assignments are active, what their progress is and what assignments are adjacent or next (Figure 4).

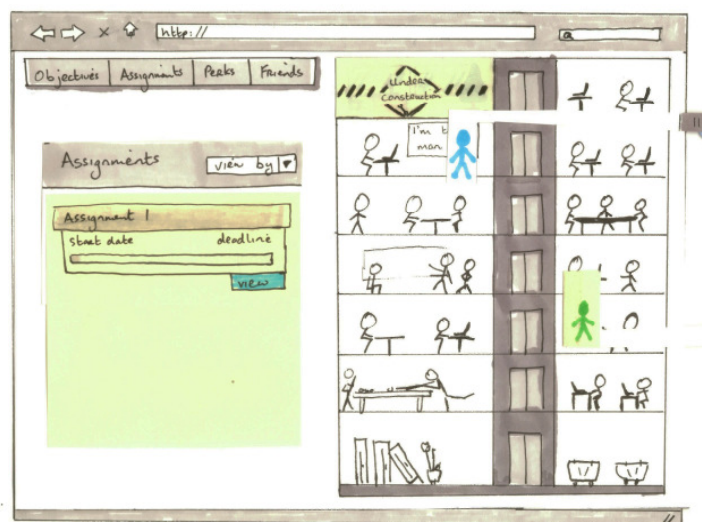


Figure 4: Gamified system prototype, assignments screen

This system facilitates the student to engage and collaborate with other students and non-playable characters (Figure 6. D). If the student wishes to engage as a killer player type, the student may choose to compete against other players. Although this persona is not found in Falk's learner types, the killer type was added to this study.

Quests beyond course assignments encourage the student to develop their social and networking skillsets along with achieving rewards that visually change their avatar. This allows for autonomy over their course work and aims to offer a fun environment to engage in.

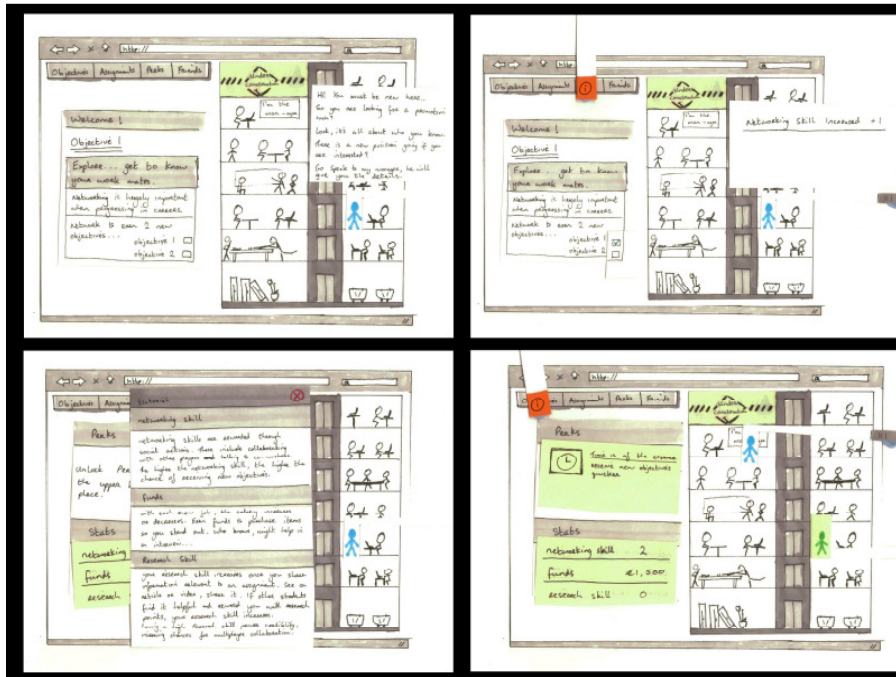


Figure 5: Gamified system prototype, Interacting with characters rewards skills and perks

4. Pilot Study

The study consisted of seven students applying the think aloud protocol to vocalise their thoughts and actions as they navigated the prototype. The prototype required two puppeteers to operate, with each testing being video and audio recorded. Each participant was interviewed at the end based on observations during the testing. The students were given a brief description of the study as many of them have never interacted with a low-fidelity prototype before but the purpose of the prototype system was not explained. This was to ensure that the student could identify its purpose without any assistance. The study was designed to capture qualitative data on how the students perceived the system, how they responded to the game elements and which player type each student characterised during the testing.

The study duration was no longer than 15 minutes per student. Out of the seven students that participated, five students were finishing their first year in Games Development at the Institute of Technology Carlow, Ireland, and consisted of four males and one female. The last two students were male and in their final year of the same Games Development course. The 1st year students were new to interacting with a low fidelity prototype whereas the 4th year students were very familiar with the process and were more confident in vocalising their opinions.

The task for each student was to create an account and complete two objectives. Objective 1 was completed by earning a skill in networking, the second objective was completed when the student has been promoted to a new office (Figure 5). Each student is presented with a screen to create an account as a new user and proceed to complete the objectives once they enter the main screen.

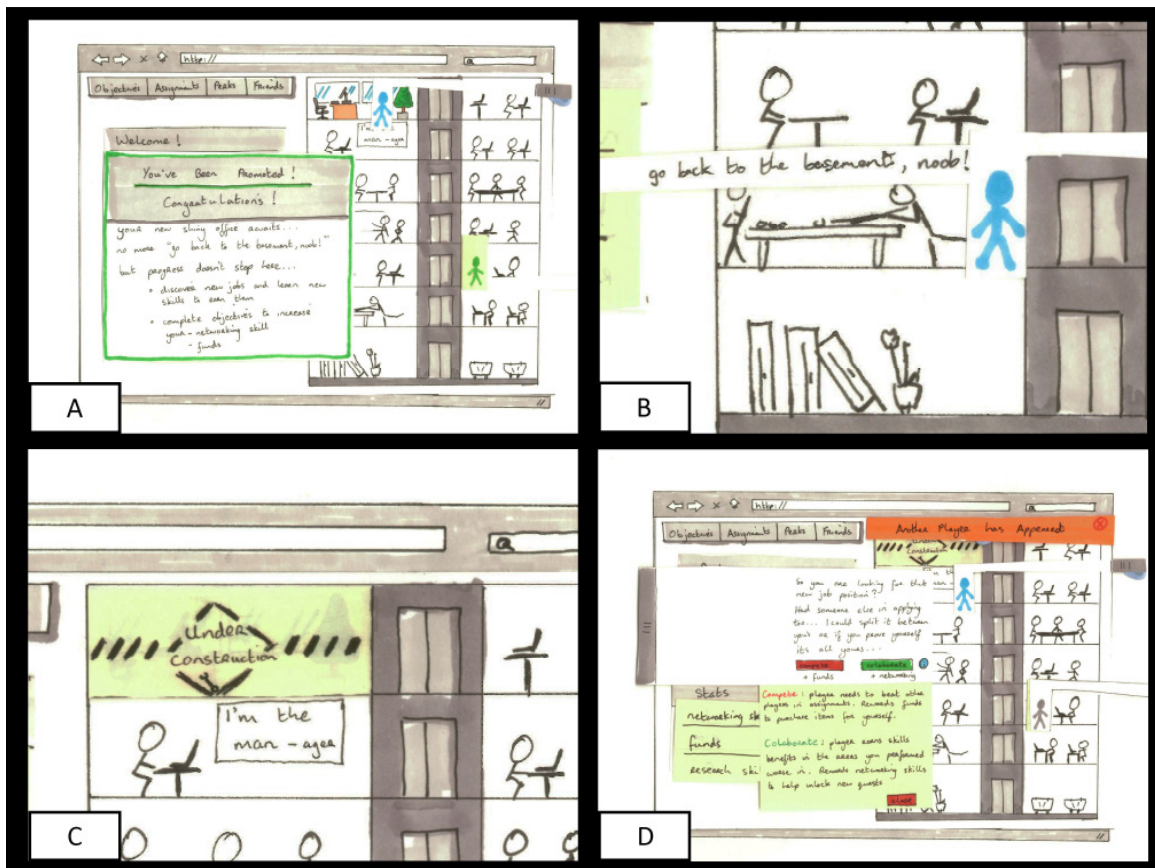


Figure 6;

- A:** Gamified system prototype, Objective 2 complete, student has been promoted
- B:** Gamified system prototype, Pool Player interaction
- C:** Gamified system prototype, The Manager's office
- D:** Gamified system prototype, Player chooses to compete or collaborate with other players

5. Results

All students successfully completed objectives 1 and 2 with two students requiring minor assistance. One of the assisted students was unaware of the notification icons that appeared therefore was unaware of interacting with them. The other assisted student was aware of the notifications but didn't know that it was necessary to interact with them to complete objectives. The other five students interacted with the notifications immediately, as they were curious to see the new content that has appeared.

Four of the students encountered issues during the character customisation screen when creating an account. Two of them encountered this issue as they were unsure of how to interact with the prototype as the experience was new to them. The other 2 experienced issues due to lack of feedback during the customise screen. The issue did not prevent them from completing the task but it did create an uncertainty on whether the character was successfully customised or not. The female participant did not customise her character as she was happy to proceed with the default character.

Once presented with the main screen (Figure 3), three of the participants felt that a tutorial was necessary to explain the purpose of the system. Another two participants felt that a tutorial was only needed to explain how to move the avatar and the last two participants felt there was no need for a tutorial, that the system provided enough information to complete the tasks. There was a variation of input from dragging the avatar from room to room, vocalising where the avatar should move to and tapping or clicking on the room they wish the avatar to go. All students interacted with the pool player first with the exception of one student who interacted with the manager first. In both cases, the student received the same response and found it humorous (Figure 6. B).

The students understood that the system was light hearted and proceeded to talk to other characters in the building. Once the students were given the task to speak to the manager, only one student did not know which character the manager was. The other students knew from the character's wall sign (Figure 6. C).

Once the manager gave the students a task which required collaborating for networking skills or competing for funds, all students chose to collaborate as they felt that receiving networking skills was more important in this game (Figure 6. D).

All of the students showed characteristics of the explorer, socialiser and achiever player types. None of the students fell into the killer category as they felt it would not be beneficial for them in earning a promotion. One of the students primarily showed achiever characteristics as he interacted with the manager first to earn his promotion where as the other students explored and interacted with many characters before talking to the manager. All of the students engaged in conversation with another player before completing the assignment, showing signs of the socialiser player type.

Not all of the participants understood the purpose of the system entirely. Two of the students saw the system as a tool for teaching the value of networking while 3 other students saw it as a tool for collaborating with students on assignments and to collaborate with students from other years. The last two students understood that the system was for preparing students for job opportunities with one of the students stating that it would not be a system he would use as he is already aware of that information. All of the students saw it as a beneficial system especially towards encouraging collaboration and six of the students said it would be a system they would use as it focuses on necessary skills that are not taught in the college curriculum.

Conclusion

This study demonstrates that students would benefit from using a resource that teaches the importance of collaboration and networking skills. The students acknowledged that these are skills necessary to know for job opportunities and that the college curriculum alone will not guarantee them a job without developing these skills. The game elements provided a context to apply the objectives to and a metaphor towards learning skills in the workplace. Although most of the participants did not make a connection between how the system could demonstrate job positions available due to skills earned from assignments, the feedback received will greatly inform the next prototype iteration.

The next stage of the study currently underway is the development of a working prototype which will focus on populating the prototype with real world assignments and jobs that the students recognise. This may reinforce the connection and meaning the system can offer in building skills toward career opportunities. The next iteration will provide further interactions to accommodate each persona and more benefits for the killer player type. The current users avoided to compete with other players as the benefits were not as great as collaborating. The next study will demonstrate if increasing the benefits for competing will encourage competition or if the killer player type is not a learning motivation.

The next prototype will be implemented into the Games Development course at IT Carlow in Ireland for a college term. This will allow for a larger sample of users to test on over a longer period. Once the term is completed, the students will be interviewed on their experience of using the system to complete college tasks. Usage data will be logged to check how long students engaged with the system and which features are predominantly more engaging.

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