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A gamified eLearning approach to teaching food regulation

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Knowledge of food regulation in Australia and New Zealand is fundamental for higher education nutrition students. Despite its importance, students are often disengaged with the learning content as it involves legislation, regulatory bodies, complex application procedures, food safety testing and political debates that often dismiss scientific fact. At a university in Victoria, students were taught this content in a passive, 2-hour, face-to-face lecture. This lecture did not provide any active learning opportunities for the students to apply their newfound knowledge. This paper describes a proposed pilot project to address learner disengagement through a gamified eLearning tool, *The Story of Hemp.* This digitally immersive teaching approach aims to reengage students with a real world context for their learning, leaving them with a greater sense of identity and significance as budding nutritionists.

Keywords: eLearning, gamification, student engagement, game-based learning, narrative-based learning

The learning problem: student disengagement

Nutrition students are required to develop an understanding of the complex regulatory structures and processes of the Australian and New Zealand food industry. Traditional delivery of this content has involved a passive learning experience that has not engaged students, resulting in superficial learning outcomes. A partnership between academic staff and the digital resource team at a university in Victoria set out to transform the student experience of the topic through the application of multimedia resources designed to provide opportunities for students to actively participate in their learning about the food regulatory environment.

Popular culture, and the controversy surrounding the use of hemp as a food product suggested this would make a lively and engaging topic for the exploration of the food regulatory process. The processes involved in the regulation and legalisation of such a product would generate interest for, and intrigue the students. An animated video was originally proposed as the medium, but after considering the script, the content was still uninteresting and un-engaging. In order to improve engagement, the academic and resource teams proposed that students needed to play an active part in learning about food legislation and its political processes. Our plan was to enable students to become virtual stakeholders in the food regulation environment; as a result, an eLearning project was decided upon, *The Story Of Hemp* eLearning game was developed.

Why gamified eLearning?

Games-based learning was chosen as it had flexibility to incorporate a wide range of user interactions and learning activities drawn from game design. Game design elements such as role-play, narrative and reward have been embedded to encourage and motivate students. Students begin the module in a realistic environment, inhabiting the role of a graduate nutritionist. Their aim is to solve a number of strategically placed real world problems. These learning challenges begin when the user is introduced to the main character Gary, a health food shop owner from Nimbin. Upon introduction, Gary expresses his desires to sell hemp products for human consumption but is restricted by legislation. This sparks a journey to Canberra to campaign for legislation change. Gary has no experience with the food regulation system and so the user must guide him by making all decisions and providing solutions. In order to provide correct information, students must actively search for and utilise relevant information that is stored in the form of documents, websites, articles and videos within the eLearning module. The main character's lack of knowledge creates an expectation for students to teach. This expectation can influence higher levels of knowledge retention compared with the expectation to be tested (Nestojko et al, 2014, p.1045).

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Upon completion of a learning activity, students are rewarded for their efforts with a digital badge and encouragement from the main character. These situation based learning activities are encompassed in a risk-free setting for learners to explore and develop their newfound knowledge. This provides a safe environment for students to practice new skills without worry of failure or consequences (p.48, Kapp, 2012). It is aimed that through role-play, students will build confidence to demonstrate knowledge and skills as nutritionists in real world settings (p.149, Kapp, 2012). By incorporating game design elements in a non-game context (Werbach, 2015), we are able to provide an enjoyable and memorable learning experience for the learners.

Narrative

Narrative has been incorporated to enhance content engagement by including the user in the story and allowing them to explore narrative pathways. Whitton and White (2012, p.45) describe narrative as a device that encapsulates story. Story consists of a number of events, settings and characters, with a clear beginning, middle and end (Whitton et al. 2012, p.45-46). In this eLearning experience, the user is immersed in the story from the beginning and plays an important decision making role until the end. Upon meeting the main character Gary, the user is guided through a number of scenarios in which they are presented with a range of pathways. These are decision-making points that provide the learner with an opportunity to explore the influence of their actions and solidify knowledge acquisition. This grants power to the learner as they "are no longer passive observers of the story, they are agents within it"(Whitton et al. 2012, p.46). Despite the overall storyline following a set structure, giving the user partial agency will provide a more memorable experience for knowledge retention and future application.

Teaching others

In this eLearning experience, users play the role of a graduate nutritionist but they are also expected to take on the role of a teacher. The main character Gary has been deliberately designed with no experience of the Australian and New Zealand food regulatory framework. Gary must rely on the students to teach him the processes of the food regulation system and make informed decisions for him based on their newfound knowledge. Students will learn deeply and recall more when they know they will soon need to teach the material to someone else (Nestojko et al. 2014, p.1046). By prompting the students to teach the main character, it is providing them with "authentic and purposeful tasks that map on to real world activities"(Whitton et al, 2012, p.11). This approach is designed to be an active learning experience for students that provides context to build confidence in their knowledge and abilities, which will develop their identity as a future graduate nutritionist.

Interactive environments

Throughout the eLearning module, students can interact with digital environments and learning activities that produce auditory, animated or written feedback (see Figure 1). This feedback guides the learner to make the right decisions to progress the game. Some learning activities include building an application to change the food standards code by dragging and dropping contents (See Figure 3); interviewing community stakeholders by clicking on provided questions and navigating the main character around Canberra by clicking the correct location. The ability for user actions to affect change within situations and environments of the game is powerful as it gives freedom to the learner to explore. Interactions that don't contain learning activities are also included to help students navigate around the environment and maintain interest for the duration of the game In Figure 1, the game instructions state: "Click on the health food shop to go inside". If the user decides against these instructions and clicks on the Kombi van, its horn will beep twice. From this auditory feedback, students will understand that this action does not affect physical change in the environment and attempt another action. "Feedback for actions is essential to be able to reflect on their effectiveness and modify them for future occasions"(Whitton et al. 2012, p.16). These interactive activities and environments provide students with a far more active learning experience in comparison with a face-to-face lecture.
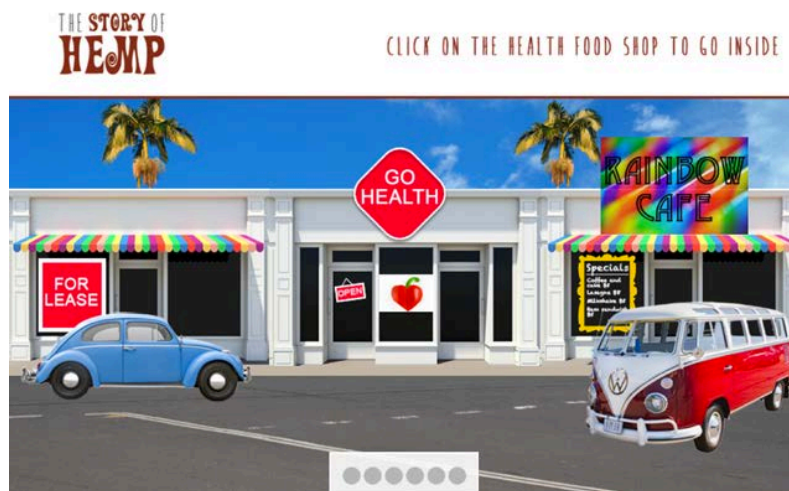
Figure 1: Interactive environment set in the town of Nimbin

Content investigation

Relevant learning content is available in a repository within the game called the 'library resource', which is located at the bottom of the screen at all times via the dashboard tab (see Figure 1 and 2). The library resource contains relevant documents, websites, videos and news articles. Students must pull content from the library resource when they are prompted by learning activities and challenges. "Instead of focusing on creating a

universal design that pushes…content, [the game is focusing] on crafting the right types of reasons a person needs to pull the content" (Kuhlmann, 2009). Digital learning activities include drag and drop interactions (see Figure 3), short answer questions and multiple choice questions. These activities are designed to motivate students to further investigate regulatory documents by providing real world context through the game's use of narrative. This is a more effective alternative to bombarding students with endless documents and articles with no goals or direction. Students have real world reasons to motivate them to investigate learning content.

Figure 2: Library resources

Figure 3: Drag and drop application writing activity

Digital badges

Students have the ability to earn digital badges within the eLearning game. These badges provide short-term goals; illustrate overall progression towards completion and hallmark real world knowledge and understanding. Students can earn six badges within the eLearning experience, with the first badge being achievable easily and early. This badge is titled the "Food stakeholder" badge and in order to receive it, students must research which government body they need to visit in order to start the campaign to change hemp food legislation. Gary's representation as a normal citizen empowers the user in becoming a change agent in the Australian food regulatory system. This badge is received early in the game to give users confidence in their abilities and sense of achievement. The frequency at which these badges are distributed is spaced out purposely to maintain a consistent level of motivation and sense of achievement from the learner. Muntean (2011, p.328) stresses the importance of using digital badges to compensate students for their academic achievements, especially difficult tasks or exercises. It is hoped that these badges will encourage students' perseverance to complete the eLearning module.

Research method

The research method that has been chosen is a mixed methods approach. Students will be aware that research is taking place. The control and experimental group will be chosen randomly and contain 100 students. The control group will be subject to the normal teaching methods (one 2-hour passive lecture presenting food regulation/legislation/associated political debates). With the experimental group being exposed to the new eLearning unit (30-45 minutes duration). Upon completion of these teaching approaches, all participants will complete a closed book, in class test that will consist of 10 multiple choice and 2 short answer questions.

These questions will address food regulation processes and their associated political debates as presented in both the lecture and eLearning unit. This test will investigate levels of knowledge retention for teaching approaches across both student groups. Results from both groups will be compared and analysed for any differences.

In the interests of fairness, students from the control group will have access to the eLearning unit after the in class test is completed. Qualitative data collection will also involve focus groups. Both the control and experimental group will have the opportunity to volunteer and assess their feelings about the use and value of the eLearning unit and its various components.

Conclusion

This interactive eLearning game has several learning outcomes that are relevant to the nutrition industry. It is anticipated that by exposing students to the dealings between different regulatory bodies, politicians and stakeholders they will gain a first hand experience of the environment of food regulation. It is intended that students will see the food regulatory system from different perspectives,

including that of the main character and various campaign stakeholders. Students will be prompted to investigate the hemp foods debate in a wider context by interviewing certain characters. Specific application timelines that food regulation bodies follow will be apparent through the illustrated passing of time. Political debate on food regulation will be presented through short videos and narrative turns in the story. It is hoped that students will live through eLearning as if they are in a graduate nutritionist internship role. It is hypothesised that this pilot study will provide positive results regarding an eLearning teaching approach when compared with a lecture-based approach. It is expected that the eLearning game will provide higher student engagement and knowledge retention through the use of gamification elements such as narrative, badges, interactive environments, role-play and feedback.

Acknowledgement

References

Kapp, Karl M. *The Gamification Of Learning And Instruction*. San Francisco, CA: Pfeiffer, 2012. Print, (p. 48, 149)

Are your E-learning courses pushed or pulled?, Kuhlmann, T. (2009, May) [Blog post] http://blogs.articulate.com/rapid-elearning/are-your-e-learning-courses-pushed-or-pulled/

Muntean, Cristina Ioana. 'Raising Engagement In E-Learning Through Gamification, ICVL Models And Methodologies'. *Proceedings of The 6th International Conference on Virtual Learning* (2015): 328 http://icvl.eu/2011/disc/icvl/documente/pdf/met/ICVL_ModelsAndMethodologies_paper42.pdf

Nestojko, J., Bui, D., Kornell, N., Bjork, E., (2014) Expecting to teach enhances learning and organisation of knowledge in free recall of text passages, *Memory and Cognition V.42: 7* (p.1045-1046)

Coursera, Werbach, K. (2015). *Gamification* [Video file] https://www.coursera.org/course/gamification

Whitton, Nicola, and Alex Moseley. *Using Games To Enhance Learning And Teaching*. New York: Routledge, 2012. Print. (p.11,16) https://doi.org/10.4324/9780203123775

Image attributions

Figure 1

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