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Experiencing university through playing property

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ABSTRACT

Junior high school students are encouraged to explore their preferences as learners and engage in a range of activities to develop understanding of work, careers and post-school destinations. Higher education providers contribute to the school students' exploration through proving campus experience programmes structured to aspire young learners and increase enrolments. This paper communicates the design science research method activities of demonstration and evaluation as they are applied to a serious game, Playing Property. Playing Property is an audience response game forming the basis of a workshop to engage junior high students and enhance their knowledge of property investment. The evaluation discusses trends in audience response decisions along with brief survey responses from 12 workshops, conducted over 3 years. The workshops were consistently rated positively by the participating students, with a majority indicating they learned more about property [investment] through playing. Comparatively the results were in line with other hands-on workshop activities facilitated by academic leaders from other disciplines. The resource allocation to the Playing Property workshop is notably less than comparable workshops and the ability capture decision-making data provides a sound basis for further analysis.

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Introduction

Background

Junior high [school] students are encouraged to explore their preferences as learners and engage in a range of activities to develop understanding of work, careers and post-school destinations. Higher education providers contribute to the school students' exploration through proving campus experience programmes structured to aspire young learners and increase enrolments. Experience USC day is an example of an annual junior high engagement programme where students attend two 70-min workshops in areas of interest, which involve hands-on and interactive activities.

The marketing and communications department of the University of the Sunshine Coast (USC) define the objectives of the two-day event as:

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to increase campus access to school students in …

to provide an avenue for prospective students to experience the University campus and community, enhancing the perception of quality of USC through first-hand experience

to promote USC's programme offerings to a primary target market

to enhance prospective students' knowledge about career pathways and graduate outcomes (University of the Sunshine Coast Marketing & Communications, 2015a, p. 1)

Attendance at Experience USC day increased from 1500 in 2013 to just over 1800 in 2015 (University of the Sunshine Coast Marketing & Communications, 2015a). Over the three years the event consistently rated positively by the vast majority of participating students (90% in 2014), with 74% respondents indicating that the workshops helped with decision-making about their career (University of the Sunshine Coast Marketing & Communications, 2015a).

The workshops associated with Experience USC day are considered an opportunity to create an engaging experience to promote the study the Bachelor of Property Programme, at USC, and encourage participation in the property profession. An existing serious game, Playing Property, was incorporated into the workshop as the activity to engage with the junior high students.

The PED Property Investment Game, an early variant of the Playing Property game, was designed and developed by the author in 2011. The game was created with the purpose of helping students and the general public to better understand property markets (Boyd, 2015).

Method

This paper commences with a review of previous research into serious games. The research extends to communicate the design science research method activities (Peffers, Tuunanen, Rothenberger, & Chatterjee, 2008) of demonstration and evaluation as they are applied

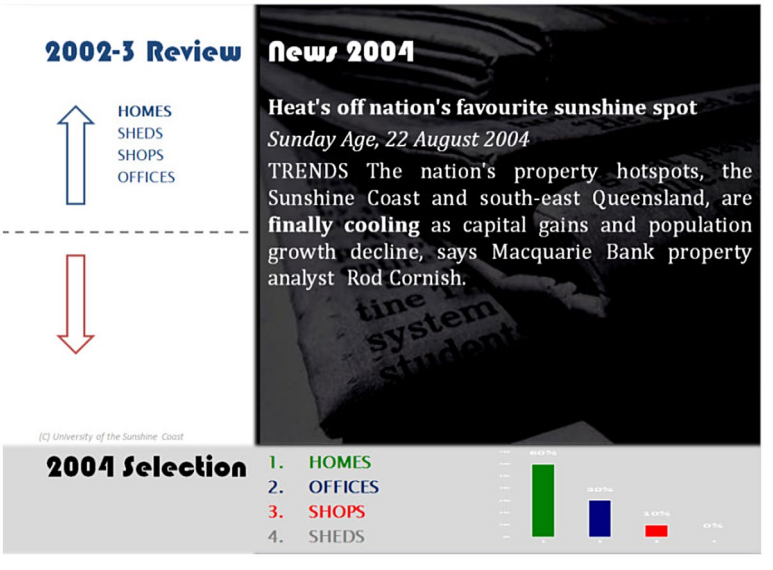

Figure 1. Playing Property game 'selection' slide screenshot. Source: Boyd & University of the Sunshine Coast, 2013.

to the re-purposing of the Playing Property serious game. Playing Property provided the main learning activity in the property education-related Experience USC day workshops.

The problem, and focus of the evaluation in this research, relates to engaging junior high students and enhancing their knowledge of property investment within resource and time constrained workshops.

While the research method and design of the Playing Property serious game were primarily qualitative in nature, the evaluation discusses trends in audience response decisions along with brief survey responses from twelve workshops conducted over the three years.

Literature review

The research problem in this project relates to engaging junior high students and enhancing their knowledge of property investment. As such, the related research question may be phrased as "how can a workshop be designed to engage junior high students and enhance their knowledge of property investment".

Games present an innovative means to engage participants, and serious games may encourage functional learning. As such this literature review addresses what insights may be gained from the emerging research into serious games.

Serious games

Games, the focus of this research project, are by their nature problem-solving vehicles, aligned to the social constructivist theory of learning (Vos, van der Meijden, & Denessen, 2011). Games, and play, have an established relationship with problem-based learning. Through meaningful play, Vygotsky (1978, cited in Young et al., 2012) proposes that one might "develop abstract imaginative thinking and realise goals that they could not yet achieve in real life".

By definition, games are to be regarded as "activit[ies] that one engages in for amusement" (Oxford University Press 2014). In extending the definition, with reference to published research, the critical defining theme relates to games being amusing, fun, or inciting play. According to Rieber (1996) and Crookall (2010) play, as it relates to game design, is complex and difficult to define, yet relatively easy to observe. The benefits associated with play in education are evident in the context of emotive learning and engagement. As such games, or more specifically games designed to enhance learning, "serious games", may be an educational tool to add engagement to traditional teaching practices or even present as separate stand-alone learning and teaching activities.

The origin of the term "serious game" is contested in literature, with credit attributed to Clarke Abt for the work in his 1970 publication by that name (Abt, 1987) and to the later Serious Games Initiative of 2002 when the term became widespread (Susi, Johannesson, & Backlund, 2007). Authors acknowledge the seemingly oxymoronic lexicon grouping (Abt, 1987) as "serious games" appears to be a contradiction between its parts, with the terms "serious" and "game", seemingly being mutually exclusive (Poplin, 2011). The conflict is addressed further in consideration of embedding educational content (Klopfer, Osterweil, & Salen, 2009). However, for the purpose of this research, Poplin's definition of a serious game provides a sound orientation for advancing the project as "serious games aim to support learning processes in a new, more playful way" (Poplin, 2011, p. 195).

Poplin's (2011) reference to "new" relates to the intervention of a serious game within an established learning process or programme. Her definition is not set to imply that games are a new intervention in learning. Rather, games and education have a relationship predating historic records and spanning cultures and species. Gameplay, manifested as play with rules, is evident in the evolutionary journey as children pretend to be parents, or whale calves mimic the breaching dance of their mothers. In discussing schools and games, Crawford (1984) sets an advocatory position for games in education in:

> Games are thus the most ancient and time-honoured vehicle for education … We don't see mother lions lecturing cubs at the chalkboard; we don't see senior lions writing their memoirs for posterity. In light of this, the question, "Can games have educational value?" becomes absurd. It is not games but schools that are the newfangled notion, the untested fad, the violator of tradition. (Crawford 1984, p. 18)

Serious games and engagement

Serious games may present an intense and dramatic scene for interpersonal experimentation. Monopoly is an example of a property game where the real object of the game may be regarded as to either win or make others lose and drive them out of the game (Axelrod, 2002). In this way the environment is set for ruthless play. As discussed by Axelrod (2002), ruthless play does not imply unethical play, but rather it means "defining victory ethically and, within that definition, devoting your efforts to winning, to playing fairly but ruthlessly" (Axelrod, 2002, p. 135).

Engagement in serious games may be enhanced through systems that integrate challenges and rewards. According to Johnson, Adams Becker, Estrada, and Freeman (2014) major corporations and organisations are consulting with gaming experts to design of programmes that motivate workers through systems that incorporate challenges, level-ups and rewards. Audience response "clickers" invite the audience, or class, to participate in the activity with their choices potentially changing the course of the exercise or influencing the outcome. Through the interaction and appropriate facilitation there is the potential to make the learning activity engaging (Cain, Black, & Rohr, 2009; Medina et al., 2008) or even fun.

Serious games and learning

In review of the published research, it is evident that the argument has moved beyond the question of whether games are or are not effective learning tools. The discussion is more precisely focused on what the student learns when playing a game. In support of the student-centred learning focus, Egenfeldt-Nielsen (2009) and Wu, Chioub, Kao, Hu, and Huang (2012) criticise the majority of published studies, noting they are not based on learning theory or aligned to learning content. Specifically, Egenfeldt-Nielsen (2009) speaks of a next generation of educational games needing to be tailored more closely to actual learning content. Similar conclusions, incorporating the act of gaming and skill development, are supported by Gee (2011), Klopfer et al. (2009), and Connolly, Boyle, MacArthur, and Boyle (2012). Precisely, Connolly et al. (2012) reflect upon games and learning outcomes through encouraging further qualitative studies to extend our understanding of the nature of engagement in games, and:

> To encourage the use of games in learning beyond simulations and puzzles, it is essential to develop a better understanding of the tasks, activities, skills and operations that different kinds of game can offer and examine how these might match desired learning outcomes. As with

> other educational interventions, it will also be important to consider the detail of how games are integrated into the student's learning experience. (Connolly et al., 2012, p. 672)

Besides investigations into the computer-based simulation game SimCity, and related game variants that look into the relationship between town planning education and a simulated city development, such as the study by Adams (1998), there is limited discipline-centric support for the inclusion of serious games in teaching property (Boyd, 2015). With the exception of pilots, or initial investigatory studies, no researchers within Australian universities have empirically tested or rigorously evaluated the parallels or alignment between what an individual student may learn from playing a game, and the intended learning outcomes. The initial or pilot studies by the author, Boyd (2015), support the assertion that a serious games suite may enhance the learning experience for property students by providing a motivating activity that may develop their knowledge of property theory and function.

The games evaluated in the studies by Boyd (2015) and Adams (1998) were integrated into university courses. The students' learnings from the game play were not assessed in isolation, but rather in conjunction with set reflection-based assessment tasks. In both studies, students were encouraged to adopt deeper reflective practices and discuss ideologies in a similar matter to the critical reflection stages proposed by Boud (1985) and debriefing as advocated by Crookall (2010). In justifying the use of reflective journals and practices, Biggs and Tang (2009), connect the process of reflection as guiding professional functioning, and assessing intended learning outcomes.

Summary

Serious games aim to support learning processes in a more playful way. As such, they must be fun and incite play and should satisfy learning goals or outcomes. The benefits associated with play in education are clear in the context of emotive learning and engagement. Serious games enhance learning, and proponents support the role of playing games in supporting collaboration, problem-solving, communication and critical thinking. Similarly, gameplay is said to present the means for a student to develop abstract imaginative thinking and realise goals not yet achievable in real life.

The attributes associated with playing serious games align well with the objective of the Experience USC day workshop, to engage with the junior high students and enhance their knowledge of property investment. Conversely, published research does not clearly define how well the playing of serious games contributes to engage junior high students and enhance their knowledge of property investment. Furthermore, the use of reflective practice as tool to evaluate the serious game may be limited due to the inherent time and resource constraints associated with the Experience USC Day workshops.

Research method

This paper communicates the design science research method activities of demonstration and evaluation as they are applied to the re-purposing of a serious game, Playing Property. According to Peffers et al. (2008) the respective activities are to demonstrate the use of the artefact, and observe and measure how well the artefact solves one or more instances of the problem.

The problem, and focus of the evaluation in this research, relates to engaging junior high students and enhancing their knowledge of property investment within a resource and time constrained workshop. Resources for the property workshop were limited to a volunteer coordinator, audience response system and a standard lecture theatre. The duration of the workshops were restricted to 70 min inclusive of the time required to conduct systems orientations and activity evaluations.

The evaluation discusses trends in audience response decisions along with brief survey responses from 12 workshops, conducted over three years.

Playing property

Playing Property is an audience response game forming the basis of a workshop to engage junior high students and enhance their knowledge of property investment.

The audience response system driving the play of Playing Property is regarded as an engaging tool (Cain et al., 2009; Medina et al., 2008) to encourage students to communicate and participate. To support engagement and further set the activity as a game, points are tallied and winners provided with a modest reward. Similarly, a game atmosphere is set with participants encouraged to collaborate and use spite or malice in a playful way to ensure success over their classmates.

Playing Property, aims to simulate property investment on the Sunshine Coast, Queensland, Australia (Boyd, 2015). From the onset it was acknowledged that the game would need to accurately reflect the movements of the respective property markets and, as such, a rigorous process was developed to collect and apply the market information (Boyd, 2015).

In Playing Property, ruthlessness in gameplay is encouraged through player-to-player communication where students are free to assist or mislead their peers. For those misled, it is made difficult to ascertain whether or not the advice giver made a similar error in their selection, as the results presented on screen are maintained in a generally anonymous manner.

Method of play and instructions

Acknowledging the purpose of the game and the capacity of the audience response system, the game is structured in a manner whereby the players play to win through making the best investment selections each game year. The Playing Property game instructions express the intent of the game as:

> Buy, hold and sell Sunshine Coast property to get rich.
>
> The player who reads the markets bests wins. If your property's return goes up gain a point. If it goes down lose a point (Boyd & University of the Sunshine Coast, 2013, s. 2)

To buy, hold and sell, players are given the chance to select from the set property asset classes. Selecting the same class year-on-year implies holding and the option of not selecting means no points are gained or lost, with the player pulling out from the property market for that term.

To encourage more play, fun and interaction, the game was intentionally designed to encouraged discussion and team play. The instructions for Playing Property address the interactions through noting, "work as a team, chat and discuss but make your own decision" (Boyd & University of the Sunshine Coast, 2013, s. 2). In supporting the instructions the

facilitator would suggest that the players talk, share information from their own experiences, and even collaborate or collude. On the other hand, the instructions would extend further with the facilitator reminding the players that only one person could win and, as such, they may wish to bluff or pretend to make a choice opposed to their true selection. TurningPoint (LUL Technology, 2014) and the response cards made it possible to deceive others as the selection results were grouped and individual scores were displayed at selected intervals only, not at each year. Further, the individual player was not easily identifiable as the hidden code on the back of the response card was displayed instead of the player's name.

To break the potentially repetitive game sequence, additional slides were included to present interim scores, and provide an opportunity to increase or reduce the wager on the outcome of the final year's performance. Towards the end of the game, interim scores for the top participants are presented for reference. Shortly after the presentation of interim scores, players are given the opportunity to wager a proportion of their accumulated points on the results of the final year. In practice, the approach is similar to leveraging, through using another's funds to increase return, and risk, or even gambling, with the questions and options presented as "What % of your points would you like to wager on the last question?".

At the conclusion of the game, final scores are shared and awards, in the form of chocolate, given. As the game completes, the baseline information forming the method for allocating the points is shared. It is intended that the chart puts the gameplay into perspective and demonstrates to the participants the way the asset classes moved. Assuming the participants have just "experienced" the market, they have a greater appreciation for, and association with, how property markets trend. They may be more inclined to take the opportunity to reflect in a deeper manner, and ultimately plan how the experience and information will be useful to them into the future.

Findings

The evaluation discusses trends in audience response decisions along with brief survey responses from 12 workshops, conducted over three years.

Trends in audience response decisions

Across the three years there were 279 participants in the Playing Property workshops. The workshops were conducted in a similar manner with a common baseline. The later 2015 version comprised some minor amendments and the game was shortened, commencing in game year 2004.

The proportion of participants making a property asset selection varied from question to question with the greatest participation, 94%, in game year 2003. Presumably the global financial crisis encouraged a conservative investment approach with one in four (26%) abstaining in game year 2008.

Over the game horizon, homes were the most popular asset class being selected in 7 of the 13 game years. Notably, as displayed in Table 1, industrial property, "sheds", was the most popular investment choice in 2008. The students' selection may have been influenced by the newspaper extract that read "Plenty of Sunshine-Industrial land in big demand" (The Courier-Mail 2008, cited in Boyd & University of the Sunshine Coast, 2013).

With respect to points, the students' performance broadly followed the markets. In the earlier part of the games the markets performed well with most asset classes reflecting gains. The students struggled in the game years 2010–2012, as the markets became more volatile. They lost points through investing in shops and offices in 2010, and then in 2011 total returns from homes and sheds declined.

When asked "what % of your points would you like to wager on the last question", around one half (133) of the participants (279) chose to go "all in", 100%, with the remaining responses generally evenly spread between nil, 25, 50 and 75%. The all in approach was fortuitous for all except those who choose sheds in game year 2013. The resulting scores and profiles are presented in Table 2.

In 2014 and 2015, the games slides were extended to provide for audience responses to questions regarding enjoyment and learning. The questions were framed in a short and direct manner in an aim to avoid excessive surveying. The questions were phrased:

(1) Did you enjoy playing Playing Property?
(2) Did you learn more about property through playing Playing Property?

For each question the participants could choose one of four responses, being:

(1) Yes, strongly agree
(2) Yes, agree
(3) No, disagree
(4) No, strongly disagree

The response rate was relatively high with three out of four students prepared to register whether they enjoyed the experience and if they felt that they learned more about property through play.

Of the responses the vast majority, 88%, agreed that they enjoyed the experience and 87% considered that they learned more about property through playing Playing Property.

Table 1. Response selection profile.

Response selection	2001[1]	2002[1]	2003[1]	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013[2]	Total[1]
Nil	17	14	12	28	32	45	38	72	43	58	43	38	22	462
Homes	61	66	58	58	86	28	50	38	63	76	72	69	89	814
Offices	33	35	50	71	72	73	80	52	64	67	53	62	62	774
Shops	49	48	45	71	55	75	71	34	72	34	57	78	64	753
Sheds	26	23	21	51	34	58	40	83	37	44	54	32	42	545
Total	186	186	186	279	279	279	279	279	279	279	279	279	279	3348
Point Average	.63	.92	.94	.90	.89	.84	.86	.74	.58	.07	−.06	−.30	3.48	9.66

[1]Game years 2001–2003 were excluded from the 2015 Experience USC Day workshop.
[2]Participants could wager additional points in game year 2013.

Table 2. Final point statistics.

Year	No.	Maximum	Upper quartile	Median	Lower quartile	Minimum
2013	38	17.0	13.0	11.0	1.0	.0
2014	148	25.0	15.0	11.0	7.0	−1.0
2015[1]	93	19.0	11.0	8.5	5.0	−1.0

[1]Game years 2001–2003 were excluded from the 2014 Experience USC Day workshop.

There was a notably higher proportion of participants who "strongly" agreed that they enjoyed the experience, as opposed to "strongly" agreeing that they learned about property, as depicted in Tables 3 and 4.

Survey responses

At the conclusion of the Experience USC day students received a survey providing them with the opportunity to rate the sessions they attended and provide formative comments. The survey tool utilised a five-point scale ranging from poor to excellent. The completed surveys were then collated with the university marketing and communications distributing the findings to the session facilitators.

Due to the delivery style, the response rate was relatively high at 86%. Of the responders, 94% considered the Playing Property based workshop as "good" to "excellent" as presented in table 5.

The summative survey responses appear to be in line with the audience response system findings and the other hands-on Experience USC day workshop activities facilitated by academic leaders from other disciplines, which consistently rate highest in the "very good" category. The resource allocation to the Playing Property workshop is notably less than comparable workshops (where up to three helpers are present) and the ability capture decision-making data provides a sound foundation for further analysis.

The formative student comments provide for a modestly deeper expression of their experience. Due to relative restrictions with time, resourcing and the limited attention span of many younger participants, further transformative reflective practices were unable to be incorporated in the workshops. Nevertheless, through analysis of the brief comments, common themes emerged as detailed in Tables 6 and 7.

Table 3. Response to question 'did you enjoy playing …?'.

Year	Yes, strongly agree	Yes, agree	No, disagree	No, strongly disagree	Total
2014	51	42	2	11	106
2015	37	27	4	4	72
Total	88	69	6	15	178
%	49.4	38.8	3.4	8.4	100.0

Table 4. Response to question 'did you learn more about property through playing …?'.

Year	Yes, strongly agree	Yes, agree	No, disagree	No, strongly disagree	Total
2014	40	37	5	16	98
2015	33	44	7	6	90
Total	73	81	12	22	188
%	38.8	43.1	6.4	11.7	100.0

Table 5. Student 'satisfaction' rating of property workshop.

Year	Excellent	Very good	Good	Average	Poor	Total
2013	22	18	7	1	0	48
2014	36	53	17	4	1	111
2015	28	23	21	8	0	80
Total	86	94	45	13	1	239
%	36.0	39.3	18.8	5.4	.4	100.0

Source: University of the Sunshine Coast Marketing & Communications, 2013, 2014, 2015b

Table 6. Students enjoyed most from the property workshop.

Year	Playing the game	Interaction/ engagement	Learning something new	Fun experience	Clicker and technology	Prizes	Achievement / winning	Interesting	The challenge/ something different	Property	Atmosphere/environment	Facilitator	It was my chosen workshop	Understanding
2013	23	17	7	10	4	1	2	3	1	0	0	1	0	0
2014	46	19	10	6	7	5	3	3	2	2	2	0	0	0
2015	34	13	13	11	5	6	5	3	4	2	1	1	0	0
Total	103	49	30	27	16	12	10	9	7	4	3	2	0	0
%	38	18	11	10	6	4	4	3	3	1	1	1	0	0

Source: University of the Sunshine Coast Marketing & Communications, 2013, 2014, 2015b, and author.

Table 7. Students enjoyed least from the property workshop.

Year	Playing the game	Interaction/ engagement	Didn't learn	Boring - too long/repet-itive	Technical restriction/ difficulties	Not winning / losing	Not receiving a prize	Not interest-ing	Not a challenge	Property	Atmosphere/ environment	Facilitator	It wasn't my chosen workshop	Not under-standing
2013	0	4	3	3	2	2	1	0	0	0	0	0	0	0
2014	0	2	4	13	8	10	1	0	0	1	5	0	1	1
2015	1	3	2	2	0	7	17	0	0	2	1	2	10	2
Total	1	9	9	18	10	19	19	0	0	3	6	2	11	3
%	1	8	8	16	9	17	17	0	0	3	5	2	10	3

Source: University of the Sunshine Coast Marketing & Communications, 2013, 2014, 2015b, and author.

When asked what they enjoyed most from the property workshop, the most popular responses related to playing the game, interaction/engagement, and learning something new. With respect to enjoying the engagement, one student most enjoyed "being able to work and discuss [my] opinions/ideas with others [I] don't know" (student 2013). Some students made reference to what they believe they learned such as "how property is forever changing" (student 2014).

Other students specifically addressed the learning and teaching method employed with supportive comments noting "the interesting ways others teach and techniques" (student 2014) and how they "learned new way[s] of thinking" (student 2014).

The most popular "enjoyed least" reasons related to the workshop being boring – too long/repetitive, the technical restrictions/difficulties, and not winning. With respect to repetition, the 2015 variant of the game was recast with a shorter game duration. The technical restrictions and difficulties presumably related to the TurningPoint system and clickers that on occasion would fail to run and freeze. The not winning perspective was well captured in the formative comments with a student noting "the lack of equal distribution of chocolate #socialism" (student 2015) as the part enjoyed least.

There were other creative responses not expected including a single student enjoying least "nothing, other than the 10% of people who disagreed towards enjoying this" (student 2015). This comment may have related to the shared findings of the audience responses to the question "did you enjoy playing Playing Property?"

Conclusions

An existing property game, Playing Property, was incorporated into a university workshop as the activity to engage with the junior high students and enhance their knowledge of property investment.

The findings of the survey and audience responses, appear to support the notion that playing the serious game was fun and provided an opportunity to learn more about property. Comparatively the results were in line with other hands-on workshop activities facilitated by academic leaders from other disciplines. The resource allocation to the Playing Property workshop is notably less than comparable workshops, and the ability capture decision-making data provides a sound basis for further analysis.

While the potential of game-enhanced learning has emerged, there remain numerous opportunities for future research to empirically confirm, or refute, the claim. In particular assessment tools such as reflective journals may provide for a deeper learning experience for the student and a more accurate measure of what the student has learned for the consideration of the coordinator.

A more detailed evaluation may include staged testing of what may be learned and how well that learning endures, in comparison with other forms of teaching. Perhaps the most novel extension of the research will consider how the serious game play encourages learning and, even propose new serious games and artefacts for analysis.

Disclosure statement

No potential conflict of interest was reported by the author.

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