Ganking the Ranking: The self-reported Learning Potential from a Selection of game Genres to Develop self-directed Learning

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Abstract: Game-based learning (GBL) is said to have encouraging potential for varying educational contexts and scenarios, but *how do practitioners select suitable edifying gaming content for their own unique environments?* Moreover, what are the correct strategies, recommendations, procedures and/or parameters for choosing appropriate gaming media for learning? There are countless options to choose from, varying in genre, play style, medium, difficulty, aim(s), etc. This paper presents the results of an interpretive study seeking to discern a set of requirements and qualities of informed GBL selection. Online surveys completed by history-for-education students at a South African Higher Education institution hope to bring us closer to guidelines for more effective GBL selection and application in tertiary education contexts across the globe. The following paper begins with remarks on the significance of self-direction in contemporary Higher Education and the potential for GBL to not only spur this tendency on, but to frame and support it. The conceptual framework used in the project is then unpacked as it relates to self-directed learning, game-based learning, video games and supplementary theoretical structures. The proceeding section is divided into three sections related to central study concepts, including: meta-behaviour, metacognition, and meta-emotion, with trial and error, observation and modelling, as well as reinforcement learning as subcategories of meta-behaviour that follow. Additional subcategories surrounding metacognition are then explored, namely: connected learning, reflect and improvise, logical and analytical reasoning, inquiry-based learning, and synthesis. The methodology then describes the hybrid video/survey techniques utilised to gather data relating to participant impression(s), motivational factors, challenge and educational value of GBL selection for Higher Education contexts. Results obtained provide a suitable starting point to construct a viable applied framework for such an environment.

Keywords: Game-based learning, game genres, self-directed learning, video games, history education

1. Introduction

Self-directed learning is a major field of study for 21st Century educationalists, and undeniably a critical skill in the labour market of a changing world. The modern world of work demands that people have demonstrable abilities to self-manage: their time and their inputs. Employees that can be tasked to solve a problem without micro-management and can be relied upon to use their resources responsibly and sparingly, are highly prized (Regan, 2003:593-599).

According to Loyens, Magda and Rikers (2008: 411-427), self-direction is a necessary skill in the world we are preparing our students for. However, the classroom culture that has been inherited is not designed around self-direction, and tends more towards compliant consumption, an un-flipped paradigm where students absorb what teachers say, and regurgitate it via essays, assignments and tests in order to demonstrate comprehension.

To combat this tendency, a Game Based Learning (GBL) approach is recommended. GBL has been a topic in learning for some time now. Most of the youth today all love playing games (Deterding et al., 2011: 14-17). The feeling of accomplishment, of improving, of beating an opponent, and the feedback and rewards that one gets are the sorts of things that keep one coming back for more. GBL can be great at tapping into intrinsic motivators where people are driving the direction of their own learning (ie. SDL). Done well, GBL can build on the foundations of intrinsic motivation by adding social connection and affords opportunities for extrinsic motivators such as leaderboards etc. A great GBL strategy can do wonders for user engagement (Hamari, Koivisto & Sarsa, 2014: 3025-3034).

To that end, this project wishes to address the need to develop self-directed learning among student teachers, with the aid of a GBL approach. The research question guiding this study is "What are the perceptions of 3rd year BEd History students in terms of Self-Directed Learning and the choice of video games, and how this could lead to effective GBL''? The main aim of the study is to establish and explore how the choice of video games could lead to effective GBL, that could lead to self-directed learning among 3rd year BEd students.

The main aim is operationalised in the following objectives:

- To understand the elements of self-directed learning and GBL.

- To determine why self-directed learning and GBL are important for 3rd year BEd History students.
- To establish how self-directed learning and GBL could be effectively developed in the History classroom.
- To establish what role video game choice plays in developing self-directed learning and GBL.
- To explore the student participants' perceptions and experiences regarding video game choice, whereupon it will be determined if certain SDL characteristics are visible.

2. Conceptual and theoretical framework

2.1 Conceptual framework

Three key concepts are central to this project, namely self-directed learning, GBL, and video games. All flow from one another, with self-directed learning being the central main theoretical underpinning.

2.2 Self-Directed Learning

In its broadest meaning, self-directed learning describes a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes (Knowles, 1975:18).

The characteristics of self-direction are:

- Self-direction as the continuous exercise by the learner of authentic control over all decisions having to do with learning; and
- Self-direction as the ability to gain access to, and choose from, a full range of available and appropriate resources (Knowles, 1975:18).

2.3 Game Based Learning

Definitions of game-based learning typically emphasise that it is a type of game play with defined learning outcomes (Shaffer, Halverson, Squire, & Gee, 2005). Usually it is assumed that the game is a digital game, but this is not always the case. A corollary to this definition is that the design process of games for learning involves balancing the need to cover the subject matter with the desire to prioritise game play (Plass, Perlin, & Nordlinger, 2010). This corollary points to the distinction of game-based learning and gamification. What exactly is meant by gamification varies widely, but one of its defining qualities is that it involves the use of game elements, such as incentive systems, to motivate players to engage in a task they otherwise would not find attractive. Similarly, there is an ongoing debate among scholars as to the exact definition of a game, and especially what is not a game (Salen & Zimmerman, 2004).

2.4 Video games

The following video games were shown to participants in the form of edited trailers (clips) and were questioned afterwards:

- *Assassin's Creed* (Ubisoft, 2007), a third person action game centred around the Medieval crusades;
- *Valiant Hearts: The Great War* (Ubisoft Montpellier, 2014), a puzzle adventure game set during the First World War;
- *Crusader Kings III* (Paradox Interactive, 2022), a grand strategy game set in Medieval Europe;
- *Ghost of Tsushima* (Sony Interactive Entertainment, 2020), an action-adventure game which interprets the Mongol invasion of Japan;
- *Total War: Rome II* (Sega, 2013), a tactical strategy game revolving around the ancient world, where players control a wide range of ancient nations, focusing on economy, military, and political strategies; and
- *Age of Empires III* (Microsoft Game Studios, 2005), a real-time strategy game with the colonial period as back drop, players control European, native American, and African nations in the additional content packs released for the game (DLC).

3. Theoretical framework

Self-directed learning emphasises the choices in one's learning path; in effect, intrinsic motivation as critical for self-directed learning (Loyens, Magda, & Rikers, 2008). Self-directed learning can be defined as "a process in which individuals, with or without the help of others, take the initiative in diagnosing their learning needs, formulating objectives, identifying human and material resources, selecting and implementing effective learning

strategies, and evaluating outcomes "(Knowles, 1975, p. 18). The learners need to be encouraged to take their own learning decisions in self-directed learning (Downes, 2010). Evidently, informal learning provides much more learning opportunities. People may feel demotivated to learn at school because there are constraints that could interfere with their motivation, such as demands to complete tasks without the resources available in the classroom (Wolters, 2011).

Zap and Code (2009) have been reviewing the self-directed learning of video game environments and gives a comprehensive discussion on the regulatory mechanisms of self-regulated learning, along with the self-efficacy of learners, self-determination, motivation, interest, intention, aptitude, goal and task orientation, self-awareness, metacognition, and other theories of self-regulatory learning. The design characteristics of game environments which supported self-directed learning were explored, such as the characteristics of an authentic learning environment which first involved simulating the real-life context in which students took decisions in a secure setting without any repercussions. Second, students are involved in genuine tasks in a simulated setting where transferrable skills have been learned. Third, via observing and modeling, students learned via GBL. Fourth, students have taken on diverse responsibilities in exploring and developing different concepts.

This section explains how the self-directed learning model is developed from player experience. It is structured in terms of “meta-behaviour”, "metacognition”, and “meta-emotion”. Meta-behaviour is thinking about doing and includes the subcategory of “trial and error”, “observation and modelling”, and “reinforcement learning”. Metacognition is thinking about thinking and includes the subcategories of “connected learning”, “reflect and improvise”, “logical and analytical reasoning”, “inquiry-based learning”, and “synthesis”. Meta-emotion is thinking about feelings and includes the subcategories of “dissatisfaction and anger” and “curiosity and satisfaction”.

Table 1: Self-directed learning strategies in GBL

Meta-Behaviour	**Definition**
Trial and Error	A low-order learning strategy involving an unsystematic self-directed learning process.
Observation and Modelling	Modelling occurred when the participant learnt through observing and imitating others' actions without deep understanding.
Reinforcement Learning	Learning occurred when the participant reflected on behaviour that was extrinsically motivated (Deci & Ryan, 2013) by a reward.
Metacognition	**Definition**
Connected Learning	Learning occurred when the participant could connect game features with their interests (Deng *et al.*, 2016) or prior or existing knowledge.
Reflect and Improvise	Learning occurred when the participant was faced with an unfamiliar or nonroutine game event as compared to the rest of the game.
Logical and Analytical Reasoning	Learning occurred when the participant constructed or inferred a hypothetical situation to reason about potential and enacted in-game actions.
Inquiry-Based Learning	Learning occurred when the participant actively adopted various problem-solving skills to solve problems or discover new knowledge.
Synthesis	The highest-order learning strategy that involved selecting, evaluating, reflecting, and integrating information into a coherent whole.
Meta-Emotion	**Definition**
Dissatisfaction and Anger	The learner felt dissatisfied when an unexpected event occurred during a fight, and a second-order emotion of anger was aroused.
Curiosity and Satisfaction	The learner was intrinsically motivated (Deci & Ryan, 2013) to learn by curiosity.

4. GBL Factors promoting Self-Directed Learning

Based on the study of the player experience (Toh, 2018), this section suggests some relevant factors that game designers and educators can consider when creating games to promote self-directed learning in video games in pedagogical contexts. These factors include providing "learning analytics as a metacognitive tool", "gradual release of new information over time", "a safe space", "defamiliarisation mechanics", and "scaffolded learning".

Table 2: Factors which promote self-directed learning.

No.	Factors Promoting Self-Directed Learning
1	Learning Analytics and Data Visualisations
2	Gradual Release of New Information Over Time
3	A Safe Space to try Multiple Approaches and Learn from Failures
4	Defamiliarisation Mechanics
5	Scaffolded Learning: An In-Game Companion

The following section outlines the methodology used in this study.

5. Methodology

A qualitative, phenomenological design is chosen. Phenomenology is an approach to qualitative research that focuses on the commonality of a lived experience within a particular group. The fundamental goal of the approach is to arrive at a description of the nature of the particular phenomenon (Creswell & Poth, 2016). Typically, interviews are conducted with a group of individuals who have first-hand knowledge of an event, situation or experience. The interview(s) attempts to answer two broad questions (Moustakas, 1994): What have you experienced in terms of the phenomenon? What contexts or situation have typically influenced your experiences of the phenomenon (Creswell & Poth, 2016)? Other forms of data such as documents, observations and art may also be used. The data is then read and reread and culled for like phrases and themes that are then grouped to form clusters of meaning (Creswell & Poth, 2016). Through this process the researcher may construct the universal meaning of the event, situation or experience and arrive at a more profound understanding of the phenomenon.

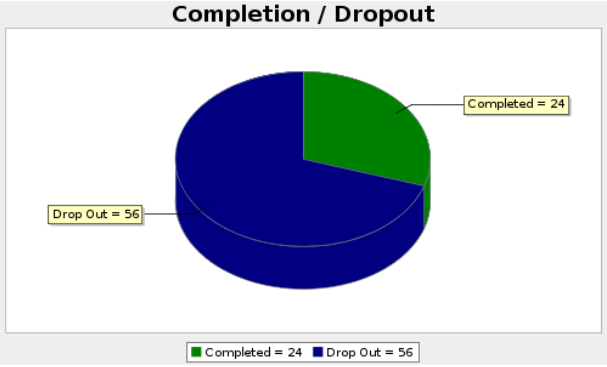
The target population for this research are all BEd students in South Africa. As it will not be possible to do research with all these students, the study population only included 3rd year History BEd students in the Faculty of Education at the *North-West University*, on the Vaal Triangle Campus. Due to time and logistical constraints, a non-probability, convenient, purposive sample of thirty 3rd year BEd students from the North-West University on the Vaal Triangle Campus will be used. Non-probability sampling is a sampling technique where the samples are gathered in a process that does not give all the individuals in the population equal chances of being selected (Leedy & Ormrod, 2005; De Vos & Strydom, 2011).

Purposive sampling refers to selecting participants for a specific purpose (Leedy & Ormrod, 2005; De Vos & Strydom 2011). In the case of this study, the researcher purposively focused on 3rd year History BEd students. The sample could also be considered convenient, as the participants are located on the same site where the researcher works. The 3rd years chosen are part of the researcher's module HISE 322. N=80 3rd year students

will be chosen, as possible deficiencies and weaknesses in relation to the development of self-directed learning could be identified during their studies at Higher Education level, and action plans to address the deficiencies and weaknesses during their four years of study be put in place before they complete their studies and enter their teaching careers.

A series of videos and descriptions of Historical and history-for-education adjacent video games have been presented to the participants. These videos will acquaint the students with the various types of video game genres that exist. The videos will showcase gameplay of the games, as well as some of the narrative stories of the games. The data collection strategy that will be used are one-on-one interviews with open and closed-ended questions at the end of the video game intervention. Interviews will be conducted with the selected student participants at the end of the intervention, in order to understand their perceptions regarding appropriate video games for GBL and SDL.

6. Quantitative data analysis and interpretation



Viewed	Started	Completed	Completion Rate	Drop Outs (After Starting)	Average Time to Complete Survey
188	**80**	**24**	**30%**	**56**	**23 minutes**

Figure 1: Survey completion rates, drop outs and average length to completion.

Of the total 80 students, only 24 completed the survey, with a dropout after starting at 56 students. It took approximately 23 minutes to complete the entire survey on GBL choice. The following graphs and tables analyse the first question that was asked in the GBL choice survey, namely "What was your initial reaction to the video game presented above?". Students had to score their satisfaction with the specific game trailer watched on a scale of 1 to 5, 1 being very unimpressed to 5 being very impressed.

Table 2: What was your initial reaction to the video game presented above? (*Assassins Creed*)

	Answer	Count	Percent
1.	Very Unimpressed	1	2.78%
2.	Unimpressed	2	5.56%
3.	Neutral	6	16.67%
4.	Impressed	10	27.78%
5.	Very Impressed	17	47.22%
	Total	**36**	**100%**

Mean: **4.111**	Confidence Interval @95%: **[3.764 - 4.458]**	Standard Deviation: **1.063**	Standard Error: **0.177**

Student participants responded to the *Assassin's Creed* trailer very favourably as evident from the data obtained in the visualisations above. 47.22% were very impressed, while a further 27.78% were impressed. The average mean score out of 5 was 4.111, the second highest score for all 6 games used in the study. The standard deviation for this question was 1.063, while the standard error margin was 0.177.

Table 3: What was your initial reaction to the video game presented above? (*Valiant Hearts: The Great War*)

	Answer	Count	Percent
1.	Very Unsatisfied	3	12.50%
2.	Unsatisfied	4	16.67%
3.	Neutral	3	12.50%
4.	Satisfied	11	45.83%
5.	Very Satisfied	3	12.50%
	Total	**24**	**100%**

Mean: **3.292**	Confidence Interval @95%: **[2.785 - 3.799]**	Standard Deviation: **1.268**	Standard Error: **0.259**

Student participants responded to the *Valiant Hearts: The Great War* trailer with mixed reactions as evident from the data obtained in the graph and table above. 45.83% were satisfied, while a further 12.50% were very satisfied. 12.5% were neutral, a further 16.67% were unsatisfied, while a further 12.5% were very unsatisfied. The average mean score out of 5 was 3.2.9.2, the lowest score for all 6 games used in the study. The standard deviation for this question was 1.268, while the standard error margin was 0.259.

Table 4: What was your initial reaction to the video game presented above? (*Crusader Kings III*)

	Answer	Count	Percent
1.	Very Unsatisfied	0	0.00%
2.	Unsatisfied	2	10.00%
3.	Neutral	4	20.00%
4.	Satisfied	11	55.00%
5.	Very Satisfied	3	15.00%
	Total	**20**	**100%**

Mean: **3.750**	Confidence Interval @95%: **[3.377 - 4.123]**	Standard Deviation: **0.851**	Standard Error: **0.190**

Student participants responded to the *Crusader Kings III* trailer with positive reactions as evident from the data obtained in the graph and table above. 55% were satisfied, while a further 15% were very satisfied. 20% were neutral, while a further 10% were unsatisfied. The average mean score out of 5 was 3.750, the 3rd lowest score for all 6 games used in the study. The standard deviation for this question was 0.851, while the standard error margin was 0.190.

Table 5: What was your initial reaction to the video game presented above? (Ghost of Tshushima)

	Answer	Count	Percent
1.	Very Unsatisfied	1	6.25%
2.	Unsatisfied	1	6.25%
3.	Neutral	1	6.25%
4.	Satisfied	8	50.00%
5.	Very Satisfied	5	31.25%
	Total	**16**	**100%**

Mean: **3.938**	Confidence Interval @95%: **[3.387 - 4.488]**	Standard Deviation: **1.124**	Standard Error: **0.281**

Student participants responded to the *Ghost of Tshushima* trailer with very positive reactions as evident from the data obtained in the graph and table above. 50% were satisfied, while a further 31.25% were very satisfied. 6.25% were neutral, while 6.25% were unsatisfied while a further 6.25% were very unsatisfied. The average mean score out of 5 was 3.938, the 3rd highest score for all 6 games used in the study. The standard deviation for this question was 1.124, while the standard error margin was 0.281.

Table 6: What was your initial reaction to the video game presented above? (*Total War: Rome II*)

	Answer	Count	Percent
1.	Very Unsatisfied	2	11.76%
2.	Unsatisfied	2	11.76%
3.	Neutral	3	17.65%
4.	Satisfied	7	41.18%
5.	Very Satisfied	3	17.65%
	Total	**17**	**100%**

Mean: **3.412**	Confidence Interval @95%: **[2.804 - 4.019]**	Standard Deviation: **1.278**	Standard Error: **0.310**

Student participants responded to the *Total War: Rome II* trailer with mixed reactions as evident from the data obtained in the graph and table above. 41.18% were satisfied, while a further 17.65% were very satisfied. 17.65% were neutral, while 11.76% were unsatisfied while a further 11.76% were very unsatisfied. The average mean score out of 5 was 3.412, the 2nd lowest score for all 6 games used in the study. The standard deviation for this question was 1.278, while the standard error margin was 0.310.

Table 7: What was your initial reaction to the video game presented above? (*Age of Empires III*)

	Answer	Count	Percent
1.	Very Unsatisfied	0	0.00%
2.	Unsatisfied	0	0.00%
3.	Neutral	1	5.88%
4.	Satisfied	11	64.71%
5.	Very Satisfied	5	29.41%
	Total	**17**	**100%**

Mean: **4.235**	Confidence Interval @95%: **[3.968 - 4.503]**	Standard Deviation: **0.562**	Standard Error: **0.136**

Student participants responded to the *Age of Empires III* trailer with extremely positive reactions as evident from the data obtained in the graph and table above. 64.71% were satisfied, while a further 29.41% were very satisfied. Only 5.88% were neutral, while there were no unsatisfied or very unsatisfied responses. The average mean score out of 5 was 4.235, the highest score for all 6 games used in the study. The standard deviation for this question was 0.562, while the standard error margin was 0.136.

The following section reports on the qualitative data obtained from the participants in the open survey. Each question is handled separately, and the video games are also discussed separately.

7. Qualitative data analysis and interpretation

7.1 Question 2: What factors influenced your initial impression?

7.1.1 Assassin's Creed (Game 1)

Regarding the factors that influenced the participant's impression while watching the *Assassin's Creed* trailer, one participant remarked about how he had played the game before: 'I grew up playing this game on my phone, seeing it brought back memories'. Another participant shared her thoughts on the type of game *Assassin's Creed*

is: 'It's not a game I would play or want to play so I didn't really enjoy it'. Another participant alluded to his knowledge of historical techniques and that the look of the game appealed to him: 'First and foremost I know the setting of the story from the game itself, I like the graphics and the ancient techniques they used'.

7.1.2 Valiant Hearts: The Great War (Game 2)

With reference to the factors that influenced the participant's impression while watching the *Valiant Hearts: The Great War* trailer, a participant remarked that the storytelling approach appealed to him, by saying: 'The narrator at the beginning makes one want to know more about the storyline of the game'. This is echoed by another participant, who remarked: 'I am impressed by the way the game explains the great war by not only sticking to the war but incorporating a love story to keep players intrigued'.

7.1.3 Crusader Kings III (Game 3)

Regarding the factors that influenced the participant's impression while watching the *Crusader Kings III* trailer, a participant liked how the story was delivered, by stating: 'The woman at the beginning narrates the story and we are shown how to play the game'. This is echoed by another participant, who said: 'That mother and son still hold grudges for what they did to the father', and another: 'seeing the snake on top of the baby made me feel scared', showcasing some emotional response.

7.1.4 Ghost of Tshushima (Game 4)

When analysing the factors that influenced the participant's impression while watching the *Ghost of Tshushima* trailer, a participant noted his love for anything related to Samurai, by stating: 'I love Samurai games'. This is echoed by another participant, who loved the setting, but also remarked on the visuals of the game: 'The graphics and the storyline of the samurai during the Mongol invasion, as well as the open-world adventure aspect'.

7.1.5 Total War: Rome II (Game 5)

Regarding the factors that influenced the participant's impression while watching the *Total War: Rome II* trailer, several factors were evident based on responses. One participant liked the specific historical period depicted, by saying: 'That it is based in Rome'. Another participant appreciated the strategic element of the game, stating: 'The strategy aspect of the game influenced my initial impression'. Another participant liked the visual elements of the game, saying: 'Graphics and layout of the video, content and characters'.

7.1.6 Age of Empires III (Game 6)

With reference to the factors that influenced the participant's impression while watching the *Age of Empires III* trailer, participants mentioned content related factors such as: 'The fact that the game is about Empires'. Another pointed specifically to the fact that Africa was represented in the game, stating: 'I am really intrigued by the fact that they used Africa in the game'.

7.2 Question 3: Does this game motivate you to learn more about the subject? Why/Why not?

7.2.1 Assassin's Creed (Game 1)

Regarding whether the game motivated participants to learn more about the subject while watching the *Assassin's Creed* trailer, a participant stated that games can make History come alive, by saying: 'Yes. Because the game makes you as the player to experience how it was during the time of the events of the game, so it will make the theory content come to reality'. Another concurred, by saying: 'Yes...this game is based on real history events that happened long ago, so playing it will help you understand how different events unfolded'.

7.2.2 Valiant Hearts: The Great War (Game 2)

With reference to whether the game motivated participants to learn more about the subject while watching the *Valiant Hearts: The Great War* trailer, a participant noted that she wanted to know more, stating: 'Yes I would like to find out what causes are the causes of the war'. Another participant noted the dialogue mentioning trenches, which interested her: 'Yes it motivates me cause at least I can hear they talk about the trenches'.

7.2.3 Crusader Kings III (Game 3)

When analysing whether the game motivated participants to learn more about the subject while watching the *Crusader Kings III* trailer, a participant was intrigued by the drama present in the game, saying: 'Yes it does, because it explains better more about the crimes committed and seeking for revenge. In history we learn more

about that'. Another liked the aspect of the ruling monarchy, saying: 'Yes because it highlights historical rule of kings and queens'.

7.2.4 Ghost of Tshushima (Game 4)

Regarding whether the game motivated participants to learn more about the subject while watching the *Ghost of Tshushima* trailer, a participant noted his fondness for Japanese culture, stating: 'Yes, I want to know more about history of Japan and samurai'. Another participant was more critical, saying: 'No Because it doesn't connect to any historical context'.

7.2.5 Total War: Rome II (Game 5)

With reference to whether the game motivated participants to learn more about the subject while watching the *Total War: Rome II* trailer, a participant was motivated by the storyline, saying: 'Yes to find out what happened to the king and the lady who was laying on the floor'. Another participant disagreed, saying: 'No, the game was not marketed right and that trailer was vague'.

7.2.6 Age of Empires III (Game 6)

When analysing whether the game motivated participants to learn more about the subject while watching the *Age of Empires III* trailer, a participant noted that the game could help understand specific content, saying: 'Yes it will help me learn about Ethiopian war'. Another participant agreed, saying: 'Yes I am motivated to learn about the African Royals, I think as an African it is nice to know the history of your continent before I can take interest in other continents'.

7.3 Question 4: Does this game look challenging to you? Why/Why not?

7.3.1 Assassin's Creed (Game 1)

Regarding whether the game looked challenging while watching the *Assassin's Creed* trailer, a participant noted the puzzle solving looked interesting, saying: 'No. It is interesting as I like games that are about solving different missions and help people'. Another disagreed, saying controlling the action may be a problem, stating: 'Yes it does I might not be able to play it because I think it is hard to control the person fighting'.

7.3.2 Valiant Hearts: The Great War (Game 2)

With reference to whether the game looked challenging while watching the *Valiant Hearts: The Great War* trailer, a participant noted that unpredictability looked difficult, saying: 'Yes the game looks challenging because the survival of soldiers is not guaranteed so outcomes of the game might be unpredictable'. Another participant noted that the trailer had a lot of things going on, stating: 'Yes it does because there are so many things happening at the same time'.

7.3.3 Crusader Kings III (Game 3)

When analysing whether the game looked challenging while watching the *Crusader Kings III* trailer, a participant noted the seemingly challenging progression, saying: 'Yes. Because you have to go through different stages and challenges in order to be granted the power of being a king'. Another participant disagreed, saying the game gives you enough information to succeed, by stating: 'No, because everything was explained very well, they fully explain how to defeat your opponent'.

7.3.4 Ghost of Tshushima (Game 4)

Regarding whether the game looked challenging while watching the *Ghost of Tshushima* trailer, a participant noted that the game may need some skills, stating: 'Yes it looks challenging and interesting and it needs survival skills in order to win'. Another participant disagreed, citing personal experience with this type of genre, saying: 'No, these types of games are my specialty and I enjoy them a lot'.

7.3.5 Total War: Rome II (Game 5)

With reference to whether the game looked challenging while watching the *Total War: Rome II* trailer, a participant noted that there was an apparent lack of clarity on what was expected, saying: 'Yes, it's not clear what the players mission entails'. Another participant agreed it looked challenging, but for this person, the strategic depth was more of a concern, stating: 'Yes it does look challenging because the premise of it is strategy it requires critical thinking'.

7.3.6 Age of Empires III (Game 6)

When analysing whether the game looked challenging while watching the *Age of Empires III* trailer, a participant noted that the game is easy if you have subject knowledge, saying: 'No it doesn't if you have a history background'. Another participant agreed that the game looked easy, but cited the easy controls, stating: 'No, it seem very user-friendly, and accessible'.

8. Conclusion

Participants who viewed trailers for six historically themed and history-for-education adjacent video games varied in their responses to the snippets of content shown to them. Initial responses were largely positive for each game shown. Game 5 (*Total War: Rome II*) received the most mixed reviews from participants, while Game 1 (*Assassin's Creed*) received near critical acclaim from participants. Satisfaction alone does not inevitably make a piece of edifying media appropriate, however. The results of more in depth questioning is presented below to complete the picture:

Initial impressions of game trailers viewed were influenced by, among other things, factors such as: *nostalgia* (Game 1), *genre* (Game 1, 3 and 6), *fidelity* (Game 1 and 5), *theme* (Game 1 and 6), *story* (Game 2 and 5), *framing* or *content delivery* (Game 2 and 6), *emotional response* (Game 2), *aesthetics and art style* (Game 2 and 5), *narrative elements* (Game 3), *familiarity with various content elements and/or setting(s)* (Game 4 and 6), *game focus/aim* (Game 5 and 6), and *relationship with daily activities* (Game 5). Each of these could aid educators in selecting apposite gaming media for education and/or history education.

Patterns also emerge when considering motivation to play or engage with the games shown. Incentives and drives including: *immersion* (Games 1 and 3), *accuracy* (Games 1 and 4), *appropriateness* (Games 1 and 6), *content* (Games 1, 3 and 5), *narratology* (Games 2 and 6), *game focus* (Game 2 and 6), *clarity* (Game 2 and 6), *level of control* (Game 3), *learning potential* (Games 3 and 6), *familiarity with content* (Game 4), *relevance to user* (Games 4 and 6), *intrigue* (Game 5), *overall game appeal* (Games 3 and 5), and *depth* (holistic vs shallow) (Game 5). These motivational factors should be further explored to determine their priority when selecting GBL for education. This forms the foundation of a framework for appropriate GBL selection in the classroom.

In terms of challenge, abundant aspects arise when considering GBL selection. Participants proposed elements such as: *puzzle solving* (Game 1), *critical thinking* (Games 1, 4 and 6), *difficulty* (Games 1 and 4), *control and input* (Games 1 and 6), *unpredictability* (Games 2 and 5), *clutter* (Game 2), *progression* (Game 3), *degree and depth of information given* (Games 3, 5 and 6), *strategy* (Game 3), *user interface and experience (*Games 3, 5 and 6), *skill requirements* (Games 4 and 5), *genre* (Game 4), *ergonomics* (Games 5 and 6) and *point(s) of reference* [background knowledge] (Game 6). These factors affect the approachability of a piece of media chosen for GBL—the degree to which will be measured in a future paper.

Finally, several interesting considerations surface when considering the appropriateness of the presented games for GBL, namely: *emotional affectation(s)* (Games 1 and 5), *relatability* (Games 1 and 2), *authenticity* [including violence, realism] (Games 1, 3 and 6), *utility* [relevance to topics being explored] (Games 1, 5 and 6), *analytic value* (Games 2 and 3), *salience* [degree to which a game can attract and retain attention] (Games 2 and 6), *depth* (Game 3), *auxiliary factors* [other skills/topics that can be transferred] (Game 3), *curriculum fit* (Games 4 and 6), *arousal* [curiosity, interest] (Game 5), and *overlap with other histographies* (Game 6). These factors form a checklist for edifying value and GBL selection.

A conceptual framework can now be constructed and translated into an applied framework by way of future work and testing with other game formats (tabletop games), types (simulations, training media, serious games) and test populations. An integrative literature review would also allow the researchers to compare and contrast results obtained here with work done by others. Future work from the current authors will explore these avenues and more to formulate a comprehensive framework for GBL selection in the Higher Education milieu.

Reference list

Agustianingsih, R., & Mahmudi, A. (2019, October). How to design open-ended questions?: Literature review. In Journal of Physics: Conference Series (Vol. 1320, No. 1, p. 012003). IOP Publishing.

Bonk, C. (2009). The world is open: How web technology is revolutionizing education. San Francisco, CA: Wiley.

Bull, G., Thompson, A., Searson, M., Garofalo, J., Park, J., Young, C., & Lee, J. (2008). Connecting informal and formal learning experiences in the age of participatory media. Contemporary Issues in Technology and Teacher Education, 8, 100–107.

Cook, J., Pachler, N., & Bradley, C. (2008). Bridging the gap? Mobile phones at the interface between informal and formal learning. Journal of the Research Center for Educational Technology, 4, 3–18.

Cox, M. (2013). Formal to informal learning with IT: Research challenges and issues for e-learning. Journal of Computer Assisted Learning, 29, 85–105.

Creswell, J. W., & Poth, C. N. (2016). Qualitative inquiry and research design: Choosing among five approaches. Sage publications.

De Vos, A. S., & Strydom, H. (2011). Intervention research. Research at grass roots: for the social sciences and human service professions, 4, 473-490.

Deterding, S., Sicart, M., Nacke, L., O'Hara, K., & Dixon, D. (2011a, May). Gamification: Using game design

Downes, S. (2010). New technology supporting informal learning. Journal of Emerging Technologies in Web Intelligence, 2, 27–33.

elements in non-gaming contexts. Paper presented at CHI 2011 in Vancouver, CA. doi:10.1145/1979742.1979575

Greenhow, C., Robelia, B., & Hughes, J. (2009). Learning, teaching, and scholarship in a digital age: Web 2.0 and classroom research: What path should we take now? Educational Researcher, 38, 246–259. http://dx.doi.org/10.3102/0013189X09336671.

Hall, R. (2009). Towards a fusion of formal and informal learning environments: The impact of the read/write web. Electronic Journal of e-Learning, 7, 29–40.

Hamari, J., Koivisto, J., & Sarsa, H. (2014, January). Does gamification work?--a literature review of empirical studies on gamification. In 2014 47th Hawaii international conference on system sciences (pp. 3025-3034). Ieee.

Jones, A., Issroff, K., Scanlon, E., Clough, G., & Mcandrew, P. (2006). Using mobile devices for learning in informal settings: Is it motivating? Paper presented at the IADIS International Conference on Mobile Learning, Dublin.Keller, J., & Suzuki, K. (2004). Learner motivation and e-learning design: A multinationally validated process. Journal of Educational Media, 29, 229–239. http://dx.doi.org/10.1080/1358165042000283084.

Knowles, M. S. (1975). Self-directed learning: A guide for learners and teachers.

Leedy, P. D., & Ormrod, J. E. (2005). Practical research (Vol. 108). Saddle River, NJ, USA: Pearson Custom.

Livingstone, D. W. (2001). Adults' informal learning: Definitions, findings, gaps and future research. (Working paper No. 21). Toronto: Centre for the Study of Education and Work, OISE/UT.

Loyens, S. M., Magda, J., & Rikers, R. M. (2008). Self-directed learning in problem-based learning and its relationships with self-regulated learning. Educational psychology review, 20(4), 411-427.

Lucas, M., & Moreira, A. (2009). Bridging formal and informal learning–A case study on students' perceptions of the use of social networking tools. Learning in the Synergy of Multiple Disciplines, 5794, 325–337. http://dx.doi.org/10.1007/978-3-642-04636-0

Plass, J. L., Perlin, K., & Nordlinger, J. (2010, March). The games for learning institute: Research on design patterns for effective educational games. In Game Developers Conference, San Francisco, CA.

Regan, J. A. (2003). Motivating students towards self-directed learning. Nurse education today, 23(8), 593-599.

Salen, K., & Zimmerman, E. (2004). Rules of Play: Game Design Fundamentals. Cambridge, Massachusetts: The MIT Press.

Santos, I. M., & Ali, N. (2012). Exploring the uses of mobile phones to support informal learning. Education and Information Technologies, 17, 187–203.http://dx.doi.org/10.1007/s10639-011-9151-2.

Sefton-Green, J. (2004). Literature review in informal learning with technology outside school. Bristol, England: Futurelab.

Sloep, P. (2012). About formal and informal (non-formal) learning [Web log posting]. Retrieved March 1, 2022, from http://pbsloep.blogspot.nl/2012/08/about-formal-andinformal-no.

Song, Y., Lee, Y., & Lee, J. (2022). Mediating effects of self-directed learning on the relationship between critical thinking and problem-solving in student nurses attending online classes: A cross-sectional descriptive study. Nurse education today, 109, 105227.

Svec, H., & Bechard, J. (1988). An introduction to a metabehavioral model with implications for social skills training for aggressive adolescents. Psychological reports, 62(1), 19-22.

Toh, W. (2018). A multimodal approach to video games and the player experience. Routledge.

Toh, W., & Kirschner, D. (2020). Self-directed learning in video games, affordances and pedagogical implications for teaching and learning. Computers & Education, 154, 103912.

Wolters, C. A. (2011). Regulation of motivation: Contextual and social aspects. Teachers College Record, 113, 265–283.

Zap, N., & Code, J. (2009). Self-regulated learning in video game environments. In Handbook of research on effective electronic gaming in education (pp. 738-756). IGI Global.