Developing a serious game artefact to demonstrate World War II content to History students

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Abstract

The following design paper reports on a serious game project being made by interdisciplinary researchers at the North-West University (NWU), Vanderbijlpark Campus. The aim of this venture is to develop a trading card game based on specific History content, using similar mechanics found in popular card games such as Magic: The Gathering and the Pokémon Trading Card Game. The game is called Dogs of War (DoW) and the historical figures will be depicted as various dog breeds to subvert player expectations and assuage a grim period of human History. The game itself is designed in such a way that up to six people can play together, with each player representing a faction that was involved in the war. These factions include: Nazi Germany, Imperial Japan, Fascist Italy, Great Britain, United States of America and Soviet Russia. The conceptualisation of DoW has already reached the initial play-testing phase, wherein the basic mechanics and units already having been designed. The game will be implemented in a third year History class at NWU in 2020, with the aim of researching whether the game itself can enhance self-directed learning through tangential and exciting gameplay. Focus group interviews will be held at the end of the first semester (2020) to gauge this prototype's overall effectiveness.

Keywords: Trading card game; Tangential learning; History education; Source-based questioning; Serious game design.

Introduction

The South African History curriculum states that one of the specific aims of the subject is "to create an interest in and enjoyment of the study of the past" (Department of Education, 2011:8). To this end, this paper wishes to address a specific History teaching strategy that will—in our opinion—address this specific aim of History education. This strategy is spearheaded by a new serious game artefact called *Dogs of War* (*DoW*). This serious

game is a historically-themed, competitive trading card game with a focus on humorous and whimsical representations of historical figures set during the Second World War (WW II). One of the researchers is a lecturer at the NWU, Vanderbijlpark Campus, who teaches History for Education. The lecturer in question is seeking to create a novel and entertaining method to teach what could be considered a vast and complex period of History. It was the desire of this lecturer to try to make History fun and interesting – _DoW_ was developed to this end.

A literature review revealed that locally a study has been conducted that compared two Curriculum Assessment Policy Statement (CAPS) curriculum Grade 10 History textbooks with the electronic video game _Assassin's Creed Unity_, using Seixas's (2017) six second-order historical thinking concepts (historical significance, source evidence, continuity and change, cause and consequence, historical perspective taking and the moral or ethical dimension) as categorical filters. Findings revealed that any integration of electronic games into official educational practice will require that teachers devote themselves to establishing a particular historically literate learner in line with the Department of Basic Education (DBE) and South African government's agenda. For textbook researchers, the findings open the door to similar explorations into other sections within the CAPS approved History textbooks, particularly in relation to the South African Revolution (Malkin-Page, 2016). While this study did look at the _Assassin's Creed_ video game, it looked at an electronic game which can also not be considered a serious game with the aim of teaching history. The _DoW_ game is a physical artefact that is designed to specifically develop historical thinking.

DoW has altered historical agents where different anthropomorphic dog breeds each associated with one of the six major nations that take part in the war; with major historical events and figures being depicted in this manner. Players of _DoW_ will be able to control one of six factions or nations that were involved in WW II, namely Nazi Germany, Imperial Japan, Fascist Italy, United States of America, Great Britain or the Soviet Union. Once a faction is chosen, the player can control the military forces of that nation using some traditional trading card game mechanics, such as amassing some form of power in which cards can be placed according to their cost. Card types include production points, units (either land, sea or air units with different abilities) as well as special event cards that can boost or diminish other cards. The aim of _DoW_ would be to defeat the opposing

player's general using strategy, deck-building and subject-knowledge.

The main focus of *DoW* is to teach WW II History from a tangential learning perspective (Armstrong, 2004). While the game itself can be enjoyed without any knowledge of WWII, the aim is to tangentially teach historical concepts and content in an engaging and fun way. Special flavour text at the bottom of each card, or a QR code, will link to the accurate History of that particular card. For example, the Nazi general card for Adolf Hitler would have a code that would take students to a website with more information on Hitler as a historical figure.

Philosophical underpinnings

The following section outlines the various philosophical underpinnings which are imbedded in *DoW*.

Gotta catch 'em all!

The theme of collecting sought after objects as a metaphor for developing knowledge/understanding of a subject within a certain discipline is explored in *DoW*. The cards themselves are attributed value based on a rarity scale developed by the researchers. Cognitive levels therefore determine the rarity of the cards in *DoW*. The rarer the card, the deeper the questions at the back of the card in question. Firstly, common cards only focus on basic information extrapolation. Secondly, uncommon cards focus on analysis. Thirdly, rare cards focus on evaluation. Cards are therefore named and then stratified into these three categories and from there the developers created a worksheet based on which cards are common, uncommon and rare.

A fourth type of rarity—hyper rare—was also developed during game conceptualisation. These cards are linked to application History or the practical use of History knowledge. An example of this could be a general card, such as Joseph Goebbels, who was the propagandist for the Nazis. His card is hyper rare, with a QR code link giving more information on him and propaganda. The source-based activity could ask students to synthesise all they have learned and to do a practical activity, such as creating a propaganda poster of their own using the online information. Another example could be Adolf Hitler as a hyper rare card. His URL would give information on him as a leader and his oratory skills. The activity would entail students writing a speech for their nation, to boost the morale of soldiers during WW II.

The assessment of students will be set according to this rarity scale. For example, a common Wehrmacht soldier would have a QR link to a diary entry of a German soldier. This is how the developers can ask the question: "What can be learned regarding the emotional state of German soldiers during WW II?". Basic extrapolation from the text is thus undertaken by the student to correctly answer the question posed.

Ludic activity

Transforming static, normative content into an intervention which uses artefacts that aim at generating excitement and allow for skill retention under fun conditions.

History as an applied science

An applied science is the application of existing scientific knowledge to practical applications, like technology or inventions (Bertram, 2008).

Within natural science, disciplines that are basic science—also called pure science—develop basic information to predict and perhaps explain and understand phenomena in the natural world (Dean, 2004). Applied science is the use of scientific processes and knowledge as the means to achieve a particular practical or useful result. This includes a broad range of applied science related fields from engineering, business, and medicine to early childhood education (Bertram, 2008). It is the view of the researchers that History as a subject ought to be viewed as an applied science. History as a subject has been most often described as a basic science with facts and dates, where rote learning and memorization are the key elements of learning (Dean, 2004). However, many historians argue that History can be applied using many approaches, which we believe in strongly. Historical thinking and skills can therefore be used when analysing sources, or when engaging in role-play, of which *DoW* can be considered a part.

Recontextualising "serious" subject matter

The syllabus for a third year Bachelor of Education module, HISE 322 – a new module developed in 2019 – focuses on aspects of world History from 1914-1991; encompassing 3 major events, namely: WW I, WW II and the Cold War. The lecturer decided to focus the game on one of these events, while keeping in mind that WWII had the most adaptability towards becoming a game, with various nations involved and several people who could be incorporated into a game setting. The lecturer, as subject leader

for the History for Education subject group, saw the opportunity to develop exciting new teaching and learning strategies for his modules, and sought to carry out a research project with the aid of a designer in the Faculty of Natural and Agricultural Sciences.

DoW allows African students to engage with History in a tactile, collaborative environment that tangentially teaches source-based interpretation. It reflects a moving away from standardised, western classrooms and focuses instead on "us learning" rather than "I'm learning", and fully encapsulates the notion of Afrocentric learning and Ubuntu. The game nurtures collaborative learning in a new way and introduces historical content in the form of a shared experience.

The next section will discuss in detail the role of source-based assessment in History teaching and its function within the game *DoW*.

Tangential learning

Tangential learning is the method by which persons self-educate; when a theme is presented to them in a setting that they already enjoy (Armstrong, 2004). For instance, once one has played a music-based video game, a few people may be encouraged to study how to play an actual instrument. After watching a television show that references Faust and Lovecraft, some people could be motivated to read the original works of these authors (Portnow & Floyd, 2008). Consistent with specialists in natural learning, self-oriented learning preparation has confirmed to be an effective instrument for supporting independent learning and thinking (Leland, 2016).

DoW can, therefore, be considered a tangential means of teaching History. Players essentially self-educate themselves through play. As *DoW* is at its core a game, the setting itself is already enjoyable and competitive, thanks to the card gameplay. *DoW* therefore meets the criteria for tangential learning.

Implicit learning

Implicit learning is the learning of complex information in an incidental manner, without awareness of what has been learned (Sun, 2008). According to Frensch and Rünger (2003) the general definition of implicit learning is still subject to some controversy, although the topic has had some significant developments since the 1960s (Frensch & Rünger, 2003). Implicit learning may require a certain minimal amount of attention and

may depend on attentional and working memory mechanisms. The result of implicit learning is implicit knowledge in the form of abstract (but possibly instantiated) representations rather than verbatim or aggregate representations (Seger, 1994), and scholars have drawn similarities between implicit learning and implicit memory.

Examples from daily life, like learning how to ride a bicycle or how to swim, are cited as demonstrations of the nature of implicit learning and its mechanism. It has been claimed that implicit learning differs from explicit learning by the absence of consciously accessible knowledge (Frensch & Rünger, 2003). Evidence supports a clear distinction between implicit and explicit learning; for instance, research on amnesia often shows intact implicit learning but impaired explicit learning. Another difference is that brain areas involved in working memory and attention are often more active during explicit than implicit learning (Seger, 1994). DoW can similarly teach WW II content implicitly, as the cards form the abstract representations of knowledge that Seger (1994) suggested. Due to the fun nature of the DoW card game, the learning of WW II content will be done incidentally, as the learning occurs while the game is being played, i.e. the main aim of the game is to have fun, not to learn.

History content and source-based assessment

The focus of History teaching in the South African curriculum has shifted to working with historical sources (Bertram, 2006). The aim is to enable students to extract, analyse and interpret evidence from sources, just like historians do, and write their own piece of History. Emphasis is on History as a "process" rather than a "product". It is therefore imperative for students to note that nearly all the assessment in History is based on source identification, integration and analyses (Dean, 2004).

Sources are the raw material of History (McAleavy, 1998). These include letters, documents, books, photographs, drawings and paintings, speeches, monuments, statues and buildings, tables and graphs, maps, poems, diaries, songs, etc. They can be written, oral, visual and any other material that is useful to the historian to find historical evidence.

Source-based analysis and interpretation forms the cornerstone of assessment within any History classroom in the 21st century. The application of historical skills such as extrapolation, evaluation, synthesis and detection of bias are all essential when approaching any given source, whether it is

primary or secondary in nature (McAleavy, 1998). These skills need to be taught to students through the use of a variety of source material, which could take the form of extracted texts, pictures, photographs, political cartoons, video and audio recordings or physical artefacts (Dean, 2004).

In the scrutiny of these sources, students tend to struggle with identifying significant elements and interpretations, as has been witnessed over several years by the lecturer in question (Dean, 2004). In order to combat this issue, the lecturer proposes to incorporate an entertaining and engaging trading card game based on one particular unit of History, namely WW II, in order to create exciting, engaging and above all, tangential means to develop source-based analytical and interpretation skills using the said cards (Department of Education, 2011; McAleavy, 1998). The cards would serve as the impetus for developing student curiosity and the desire to further their knowledge of that card's historical roots. Any given card is a representation of something historical that took place.

Through the use of technological means such as QR codes, each card could contain a link to a historical source that needs to be interpreted. Each link could pose a number of questions to the students, and probe their skills of analysis and interpretation. The History curriculum suggests that during source-based analysis, a 3-level approach ought to be implemented to cater for a wide range of cognitive levels and abilities of all students in the classroom (Department of Education, 2011). These levels include:

• Level 1: Extracting basic evidence from sources;

• Level 2: Explaining historical concepts; straightforward interpretation of the sources;

• Level 3: Interpreting and evaluating information from sources; engaging with questions of bias, reliability and usefulness of sources

From this taxonomy of cognitive levels used in source-based questioning, the researchers decided to create 3 levels of source-based assessment imbedded within the DoW card game itself. This would be tied in to the rarity scale used in the game. The common cards would all have level 1 source-based questions imbedded within them, while uncommon cards would be linked to level 2, and the rare cards would be linked to level 3. Once a player's card has been destroyed as part of the game dynamic, the player needs to access the source-based question at the back of the card using a QR code. The sources themselves will be connected to the card

in question. This will implicitly and tangentially teach the players about History content as well as how to tackle source-based analysis.

Descriptive science and knowledge by acquaintance

Propositional knowledge (knowledge as justified truth) is translated into knowledge obtained through direct causal (experience-based) interaction between person and object when playing *DoW*. This is achieved through various means in this serious game: (i) opening randomly seeded booster packs of cards; (ii) drafting cards with other students in class; (iii) constructing a forty card deck with drafted cards to play against others; (iv) tournament play; (vi) trading cards with peers; and (vii) completing the assessments tied to the cards themselves. These aspects will further be unpacked in a future paper.

Methodology and game design

McKenney and Reeves (2012) developed a model which features three vital steps in design research, i.e. (i) preparing for design; (ii) conducting design; and (iii) retrospectively analysing design. Education Design Research (EDR) was expanded by these researchers to visualise the interaction between these steps in practice to yield twofold outputs of both knowledge and intervention (Image 1.).

**Image 1: Model for conducting EDR**
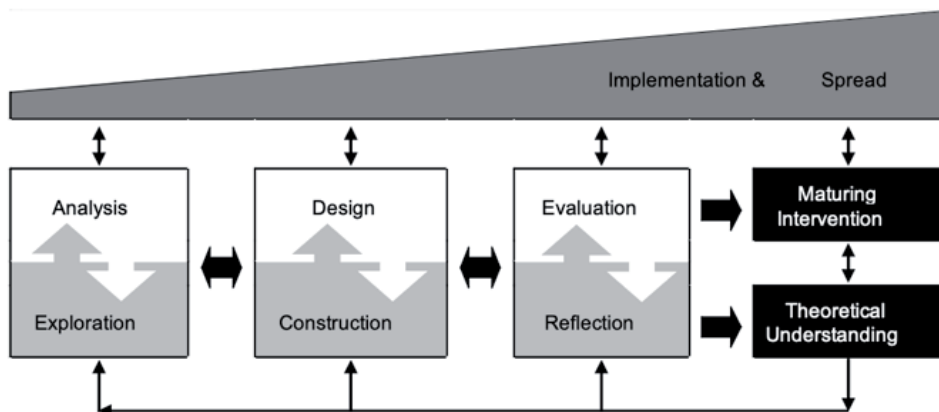
Source: SE McKenney & TC Reeves, *Conducting educational research design: What, why and how* (Taylor & Francis, 2012), p. 65.

A modified form of EDR was chosen as the methodology for *DoW*, as it is a project being developed 'in practice'; at an educational institution (NWU) where academic practitioners collaborate to solve research problems and implement interventions to improve systems therein. The methodology for *DoWs* development can therefore be described as a variation of both action research (research to improve methods) and EDR (develop knowledge and develop solutions).

Such an adaptation of the EDR model has seen real-world implementation in studies conducted by Greeff, Heymann, Carroll and Nel (2017), Greeff, Heymann, Nel and Carroll, (2018), and Bunt and Greeff (2018)—lending credence to this form of serious game development as valid and flexible. Plomp (2013) maintains that EDR affords researchers the opportunity to collect and evaluate both qualitative and quantitative data, and allows them to triangulate the findings after-the-fact. This is especially useful in a case where the researchers regularly iterate on and test game elements such as mechanics, art and pedagogical content.

Typically, in these instances, however, an adapted SCRUM agile software development cycle approach is followed (Van den Akker, Gravemeijer, McKenney and Nieveen, 2006). A new visualization of this process followed by researchers for DoW can be seen in Image 2 below.

Image 2: The EDR, SCRUM, agile development cycle for prototype 1 of DoW
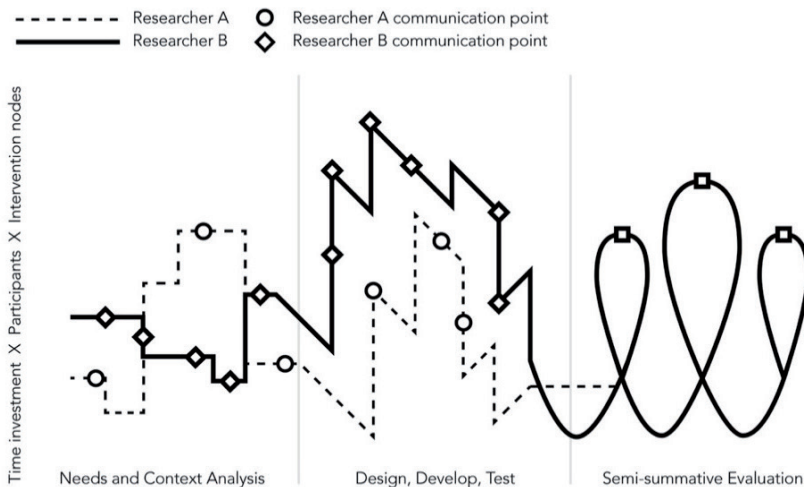
Source: J van den Akker, K Gravemeijer, S McKenney & N Nieveen (eds.) 2006, *Educational design research* (Routledge). (Author's interpretation)

As can be seen in Image 2, both researchers were exposed to various development procedures and communicated with one another at differing times. This is of great importance to such a small development team approaching a substantial serious game design undertaking; as it may hold consequence for future development teams. The adapted SCRUM agile approach has been visualised accordingly, as iteration and tuned integration of user experiences will only take place during the "Semi-summative evaluation" of the _DoW_ product. User feedback will only be integrated then for this prototype procedure.

A bottom-up design approach was taken by the game designers during idea validation and conceptualisation for _DoW_. This technique was used to firstly build the game from a purely mechanical standpoint. Art assets, game components and various other facets of the game will be crafted after the gameplay (rules, turn order, card anatomy, card interaction, etc.) and trading aspects (drafting, pack seeding, rarity etc.) have been developed thoroughly. Such a method contrasts with a top-down approach, where visual portions and "flavour" (themes, characters, places, etc.) of the game inspire the mechanics and gameplay thereof. Despite a wealth of visual inspiration (WW II uniforms, weapons, artillery, planes, tanks, etc.) available to them, the designers decided instead to take inspiration and validate their ideas using historical texts; allowing them to infuse the various nation's languages and designations into the card text itself.

The serious game was therefore designed to firstly educate and secondly entertain. Pedagogical content is therefore evident in almost all areas of _DoW_. This is largely resultant from the incorporation of assessment into the multidimensional gameplay experience. The team goal, moreover, intended to present educational content to players before gaining buy-in or to expand the player base.[1]

Inspiration

Themes of "conflict", "chronology", "tactics" and "collection" are explored in _DoW_. Battles are fought between factions of troops comprised of historically accurate – albeit quirkily interpreted – ground, air and seafaring units. The timeline explored in the base set of _DoW_ is WW II: A colossal war effort spanning six years (1939-1945). Deck building

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1 As a note to the reader, various other trading card serious games have been created and tested by these authors: Steinman & Blastos (2002); Sakamoto, Alexandrova and Nakajima (2013a); and Sakamoto, Alexandrova and Nakajima (2013b).

(strategy) and card trading/circulation round off the thematic considerations in the game. The three chief inspirations for *DoW* are: (i) Wizards of the Coast's massively popular trading card game *Magic: The Gathering* (known to many players as "Magic" or "MTG"); the (ii) *Pokémon Trading Card Game* (abbreviated as "PTCG" or "Pokémon TCG"), published by *The Pokémon Company*; and (iii) *Adventure Time Card Wars*, made by Cryptozoic Entertainment™.

  Magic allows players to cast powerful spells, sorceries, instants and enchantments in the form of highly valuable and equally sought-after cardboard trading cards. *DoW* was inspired mainly by the strategic nature of *MTG*, where players are thrust into a competitive space to overcome and outplay fellow gamers. Players use an array of fictional creatures and spells in this game, correlating with the historical agents in *DoW*. Potent and complex deck combinations are nurtured in such an environment; and *DoW* seeks to do just that—foster strategic thinking to create and hone unique, homebrew decks which can operate in a multitude of situations. The *Pokémon TCG* utilises a distinctive rarity system for a trading card game, allowing for what are colloquially called "secret rares" by fans. These cards are specially foiled and do not add to the numbers in a given set release. Instead, they fall outside of the base number of cards—heightening their clandestine nature. *DoW*, similarly, has a four-tier rarity scale (common, uncommon, rare and hyper rare), but does not follow this secret-card method in the base game. Nevertheless, the trading aspect tied to the rarity index holds value for a game such as *DoW*. *Adventure Time Card Wars* does not necessarily rely heavily on the trading aspects of a traditional collectable card game, but does focus on faction-based denominations—similar to a colour-based faction wheel used in *Magic*. Each of these groupings have mechanical ties to delineate their specific "type" of gameplay. For instance, the "Nice Lands" faction in *Card Wars* tends to have lower attack stats but can heal themselves and other creatures more often than not. Such mechanical depth is what inspired the 'Power Wheel' in *DoW*. A mood board was created to visually depict the direction the researchers wanted to go (Image 3.). Core aspects to the bottom-up design approach can be seen here, including: potential fonts for consideration, animation and motion (should the researchers create/implement electronic aspects into the game), inspirational games, card frames and styles, colour schemes, inspiring art styles and visual approaches to character design, and a number of articles relating to the games in question. This mood board was created with free-to-use software called "Milanote".
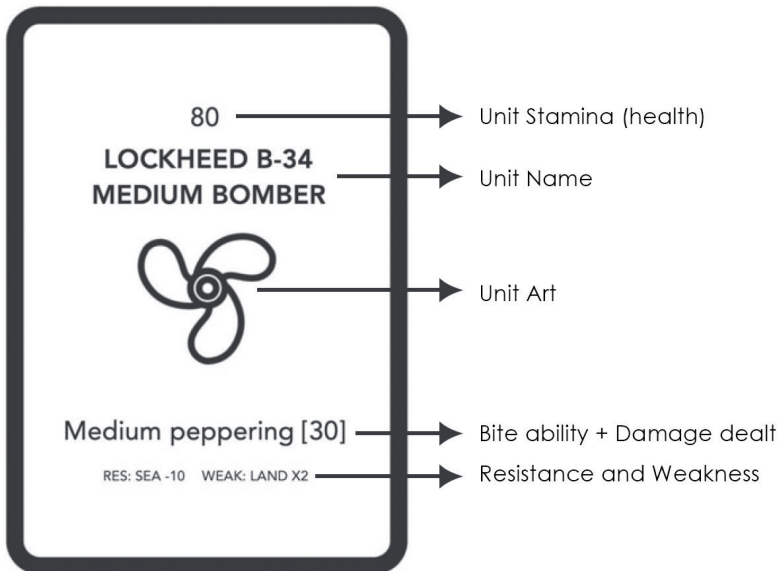
Image 3: The mood board created for DoW using Milanote
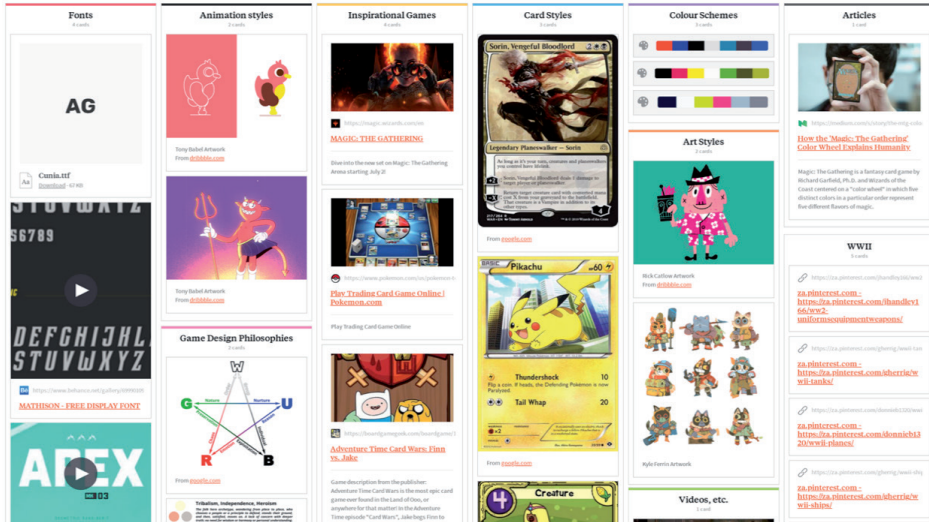
Source: Designed by author.

Iconography

Image 4: An aircraft unit card in DoW

Source: Designed by author.

The uppermost piece of information on a *DoW* card is the amount of damage a unit can sustain before it is considered KO'd and is removed from active gameplay. Below that is the official designation of the aircraft, naval unit or ground artillery. A visual representation of the unit appears in the middle/center of the card and the ability of the unit is listed beneath that. Both the unit resistances and weaknesses appear at the bottom of a given unit card, and relate specifically to the "Power Wheel" created for the game. Moreover, additional emblems will be designed to delineate the faction and unit type (air, ground or sea) attributed to each card.

Image 5: An early general card in DoW
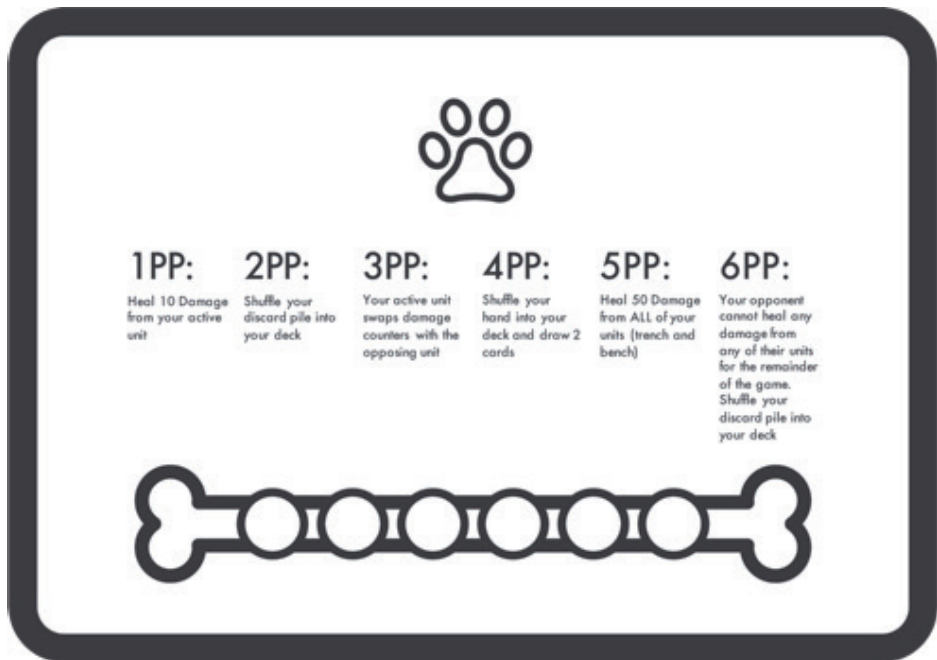
Source: Designed by author.

A general card in *DoW* (Image 5.) is more complex than a unit card at first glance, but is wholly made up of bark abilities, a track and some art (name and visual depiction). These cards allow for powerful card combinations and expending "PP" each turn lets a player make use of a single general ability.

Mechanics

The chief aim in *DoW* is to destroy the opposing general card or to eliminate six rival unit cards—whichever comes first. The game revolves around a "Power Wheel" system to achieve balance in terms of power creep and unit abilities:

Image 6: The Power Wheel in *DoW*
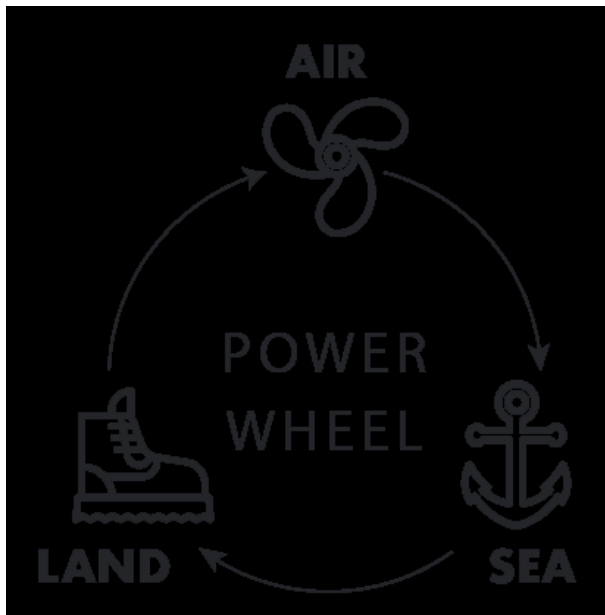
Source: Designed by author.

The game generally utilises a rock, paper, scissors system to allocate resistances and weaknesses to the various units in the game. The basic premise it that air units are strong against sea units, and sea units beat land units. Land units, in turn, are strong against air units. Additional to this system, various other mechanics and premises are spotlighted in *DoW*. Below is a breakdown of each of these:

Subversion of conflict as exclusively violent/gory

Dogs of War goes out of its way to modify depictions of a brutal and bloody war as silly and near-comical. These are difficult parameters to work inside, as the subject matter of WW II remains serious and upsetting to this day. Such a premise is explored to learn whether or not such an approach makes it easier for sensitive students to interact with the historical content if it is presented in such a way. Obviously, conflict will never be an

upbeat theme to explore; but there may be ways to adapt it or package it as something more palatable.

Using dark design patterns to nurture pedagogy

Gambling mechanics in games where luck and risk-reward play a role are typically viewed in a negative light by government officials and educationalists alike (Zagal, Björk. and Lewis, 2013). However, these instruments can be subverted to benefit students and teaching/learning practice as a whole through clever means. Why does one not tap into the brain chemistry that wants "that one rare card" to get them invested in a game that aims to teach? Tapping into these addictive tendencies can afford this game a level of nuance not yet explored in serious games at tertiary education institutions.

Altering History- one deck at a time

DoW allows players to alter timelines and see them have battles which did not historically take place (i.e. Italy V USA). This is a crucial aspect to the game, as it allows for user-created experiences. Despite this, the researchers will indicate when a real battle scenario is placed before a student. The game therefore seeks historical accuracy and freedom of expression (i.e. USA/Russia deck).

Conclusion

In conclusion, the authors wish to acknowledge that the *DoW* trading card game will be part of a Scholarship of Teaching and Learning (SoTL) project funded through the NWU. The authors have already proceeded with registering a research project intended for using the game in 2020; after playtesting and balancing have been completed. Further papers related to this approach will be published, including any research findings. It is our sincere belief that if students are having fun while learning their learning will be enhanced—which benefits education in the long run. Other particulars about *DoW* (gameplay sequencing, seeding booster packs, drafting, deck building, etc.) will feature in later papers by the researchers and additional role-players such as programmers and app developers for the game.[2]

References

Armstrong, J 2004. The natural learning project. Econ WPA. In: DC Brenenstuhl & SC Certo (eds.). _Exploring experiential learning: Simulations and experiential exercises._ Tempe: Bureau of Business and Economic Research, College of Business Administration, Arizona State University:69-77.

Bertram, C 2006. Knowledge, pedagogy and assessment in the old and new Further Education and Training History curriculum documents. _Education as Change_, 10(2):33-51.

Bertram, C 2008. Doing History?': Assessment in History classrooms at a time of curriculum reform. _Journal of Education_, 45:155-177.

Breuer, J, & Bente, G 2010. Why so serious? On the relation of serious games and learning. _Journal for Computer Game Culture_, 4:7-24.

Brown, T, Li, H, Nguyen, A, Rivera, C, and Wu, A 2014. Development of tangential learning in video games. Department of CIS, University of Pennsylvania, PA.

Bunt, L, Leendertz, V and Blignaut, AS 2017. A heuristic evaluation of the design and development of a statistics serious game. In Proceedings of the 16th World Conference on Mobile and Contextual Learning:16. ACM.

Bunt, LR and Greeff, JJ 2018. Design and development of a narrative-based tabletop game for promoting soft skills acquisition in technical students in the South African context. 2nd International Conference on Game, Game Art and Gamification (ICGGAG 2018) Proceedings.

Dean, J 2004. _Doing History: Theory, practice and pedagogy. Toward new histories for South Africa: On the place of the past in our present_. Cape Town: Juta Gariep.

Frensch, PA, and Rünger, D 2003. Implicit learning. _Current Directions in Psychological Science_, 12(1):13-18.

Greeff, JJ, Heymann, R, Carroll, J and Nel, A 2017, June. Enriching engineering student experiences of final year projects through gamification and authentic learning. In Conference Review Procedure:381.

Greeff, JJ, Heymann, R, Nel, A and Carroll, J 2018a, April. Aligning student and educator capstone project preferences algorithmically. In 2018 IEEE Global Engineering Education Conference (EDUCON):521-529. IEEE.

Greeff, JJ, Heymann, R, Nel, A and Carroll, J 2018. Location based games as the bridge between capstone students, junior students and the public. In 2018 IEEE Global Engineering Education Conference (EDUCON):538-546. IEEE.

Leland, J 2016. Edutainment in video games. *Computers for Everyone*, 1:96.

Malkin-Page, K 2016. Textbook vs assassin's creed unity: Comparing their engagement with second-order historical thinking concepts with reference to the French revolution (Doctoral dissertation).

McAleavy, T 1998. The use of sources in school History 1910-1998: A critical perspective. *Teaching History*, 91:10-16.

McKenney, SE and Reeves, TC 2012. *Conducting educational research design: What, why and how*. Taylor & Francis.

Portnow, J, and Floyd, D 2008. *The power of tangential learning*. Edge Online, 10.

Rowe, JP, Shores, LR, Mott, BW, and Lester, JC 2010. *Integrating learning and engagement in narrative-centered learning environments. In International Conference on Intelligent Tutoring Systems*:166-177. Springer, Berlin, Heidelberg.

Sakamoto, M, Alexandrova, T and Nakajima, T 2013. *Analyzing the effects of virtualizing and Augmenting Trading Card Game based on the player's personality*. In: Proceedings of The Sixth International Conference on Advances in Computer-Human Interactions:348-357.

Sakamoto, M, Alexandrova, T and Nakajima, T 2013. Augmenting remote trading card play with virtual characters used in animation and game stories. In Proceedings of the 6th International Conference on ACHI.

Seger, CA 1994. Implicit learning. *Psychological bulletin*, 115(2):163.

Seixas, P 2017. A model of historical thinking. *Educational Philosophy and Theory*, 49(6):593-605.

South Africa. Department of Basic Education. 2011. Curriculum and Assessment Policy Statement. Pretoria: Government Printer.

Sun, R (ed.) 2008. *The Cambridge handbook of computational psychology*. Cambridge University Press.

Steinman, RA and Blastos, MT, 2002. A trading-card game teaching about host defence. Medical education, 36(12):1201-1208.

Van den Akker, J, Gravemeijer, K, McKenney, S and Nieveen, N (eds.) 2006. _Educational design research_. Routledge.

Zagal, JP, Björk, S and Lewis, C 2013. Dark patterns in the design of games. In Foundations of Digital Games.