# Teaching Players How to Play: Understanding Learning and Tutorials in Games

**Lloyd Jones**

**11/01/16**

**5,620 words**

**Abstract**

Games developers and the projects they build are subject to a wide range of criticism, spanning from minor gameplay related tweaks such as a player's movement speed or jump height, to large-scale character and weapon rebalancing, but a point of feedback that can appear is that new players doesn't quite understand the point of doing what they are doing. The players may know how to operate the game with no issues, but playing and understand the game can was difficult. It's easy to tell a player what to do, but a player needs to understand why they're doing it to continue playing. So through looking at methods of learning, forms of teaching, and ludic learning, this research aims to look at learning within video games to better one's understanding of how to teach a player how to play. By taking principals and theories of teaching and learning and then turning those ideas into lenses that can be placed over contemporary games, can one then begin to investigate common practices in the industry and apply them to one's own work for reflection.

## Introduction

The aim of the research is to gain an understanding of how videogames teach their players how to play through theories in education and learning. This research has also been carried out to provide a guide, or a foundation for learning, for developers to gain better knowledge in how to engage their players in the early stages of their games. To develop this guide, the research began at looking at existing theories of learning and education. Each theory will be used as a lens for each game that will be analysed. In the context of the research, a lens is defined as a method of analysing a game through the ideas of its corresponding theory. Creating a lens from a theory will provide a clear cut structure in which scenarios in each game under analysis can be processed and understood. This means that each lens can then be applied to any scenario over the games that were used as case studies. The games in question will be sourced from multiple genres and complexities to not only test the lens, but to provide varying examples for developers to understand.

## Literature Survey

*Teaching Today* (Petty, G. 2009) was the first source of this research's lenses. Written as "a straightforward and practical 'how to teach' book", Petty discusses many different styles of teaching with their advantages and disadvantages. With an emphasis on teacher-centric methods, Petty explored the concept of "Teacher Talk" whereby the teacher talks to class. Petty describes it as "[the] most commonly used teaching method, on average occupying at least 60% of most lessons". Petty states its advantages as being that it is a "convenient method for delivering explanations", "it can be adapted to the

correct level for the class", Teacher Talk "can be inspiring", and a "more personal method". But Petty also states that students who are being subjected to Teacher Talk "[are] not required to form an understanding" and that there is "no feedback on whether understanding as taken place". Petty further elaborates that Teacher Talk doesn't give its students "opportunity to use the ideas being taught", and advises that teachers use how they say what they're saying for Teacher Talk to be effective, stating that "Students feel 'included' if you look at them and if you face in their direction (eye contact and body-pointing" with key points of information being "stressed by expressive gestures". As a lens in the research, Teacher Talk can be defined as narrator or character directly addressing the player, informing them of mechanics and controls. It can also be in the form of characters exclaiming upon certain events in a game, such as taking damage or activating an ability.

Petty then discusses another teacher-centric method called "The Art of Explaining". This method focuses on building from ideas that the students already know, "[starting] from the student's existing knowledge and experience". This method can to stem in to Petty's student-centred methods of learning.

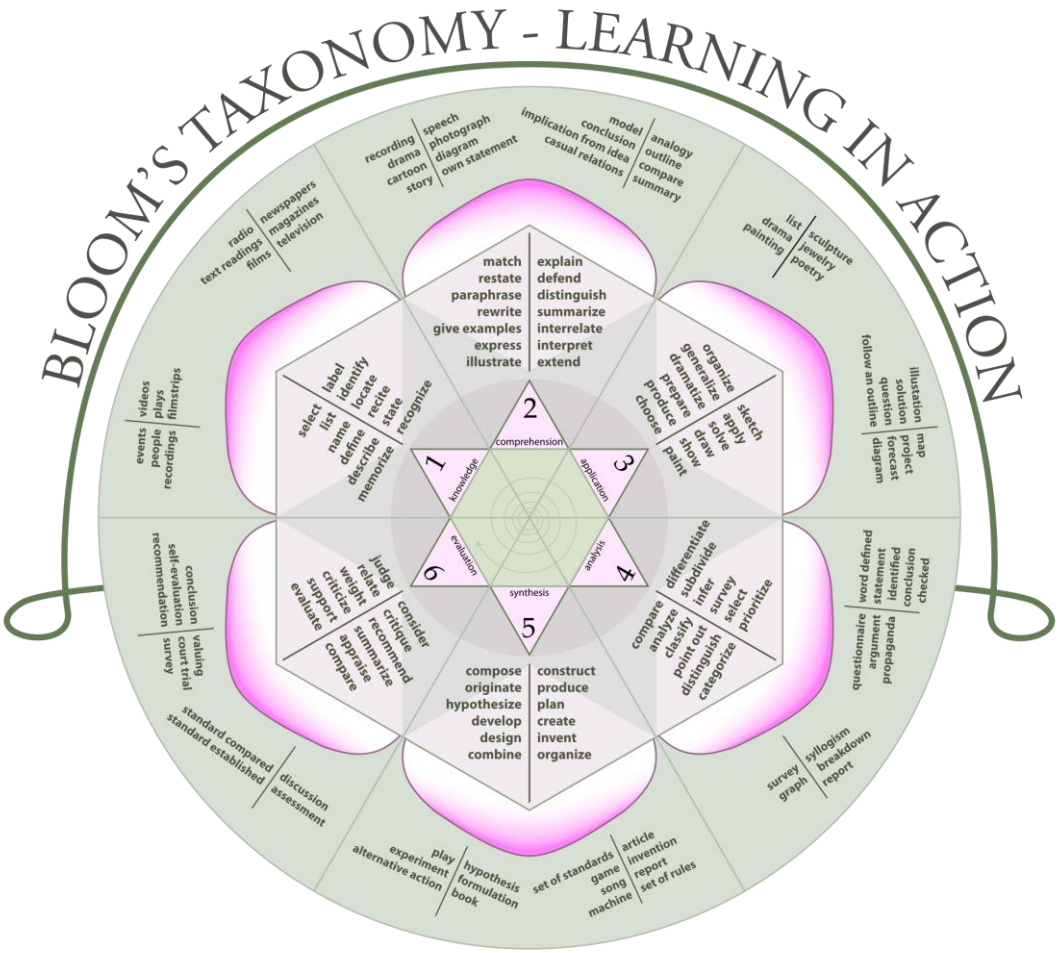
Petty also suggests a three level model for the student-centred "Reading for Learning" Method. Petty breaks down reading into three different levels that form a spectrum which illustrates the depth of knowledge that a student can gain from reading. At its lowest level, "zero-level processing" the reader just "simply goes through the motion of reading the text, believing that understanding will automatically follow" and that their highest concern with regards to reading is "getting it over [with] as quickly as possible". The next stage up, "surface level processing" describes students' concerns are

about “covering the content ... finding the right answers [and] assimilating unaltered chunks of knowledge”. Then at its highest level, “deep-level processing”, students are reading much deeper into the content than surface-level processing, focused on “the central point, what lies behind the argument, the whole picture, what it boils down to, what it is connects with, the logic of the argument, points that are not clear, questioning the conclusions”. With regards to games, a parallel can be drawn to hint boxes, or text within the game to teach the player.

Petty’s “Guided Discovery” method takes the aforementioned Art of Explaining and places an onus upon the student to initiate the learning process within a safe environment. Petty states that, in order for Guided Discovery to be successful, “learners must have any essential background knowledge of techniques they need in order to make a success of the discovery activity”. Although considered a student-centred method, Guided Discovery does still require input from a source other than the student, but Petty advises against too much external guidance as “the students [can] feel cheated of the chance to make their own discovery.” In the context of a game, the theory can be applied to any situation in which the game teaches its players through a natural process, such as designing a level that encourages the player to discover a mechanic whilst keeping the penalty in failing to earn the mechanic low. A poor example would be to take that level and have the game inform the player of the level’s solution if the player has taken too long.

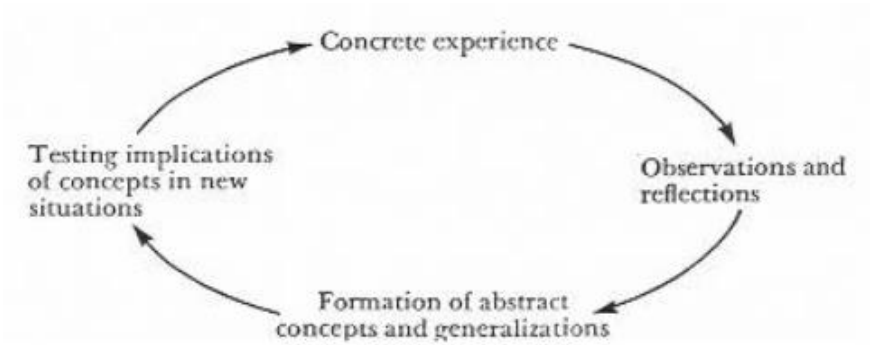
The *Taxonomy of Educational Objectives: The classification of educational goals* (Bloom, B. S., et al, 1956) provided a lens that allowed for the breaking down and expression of gameplay from an experiential learning standpoint. Whereas Petty’s theories can analyse a single point in a gameplay experience such as a piece of narration

or text, Bloom's Taxonomy can allow for a step by step analysis of any sequence of gameplay, providing interpretations of how a player may learn from a scenario created within a game. The taxonomy is comprised of six stages: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation.




These stages outline a learner's experience from the identification of an experience, their understanding of the experience, their application of their understanding, analysis of the outcome, and synthesising a theory from that outcome. In terms making this taxonomy applicable to a game, the experience can be the player being attacked, or eliminating an enemy, with the rest of the taxonomy interpreting how the player could understand the experience at the base of the sequence of gameplay.

Building from Bloom's Taxonomy, the research then made lenses from *Learning Styles and Disciplinary Differences* (Kolb, D.A. 1981). Kolb wrote a model similar to Bloom's Taxonomy that focuses on learning through experiences. Kolb suggests a four stage model in which the first stage has an "immediate concrete experience", the second stage has the learner using that experience "[as] the basis for observation and reflection", these observations are then used by the learner "to build and idea, generalisation, or 'theory'". The "theory" then serves as a "[guide] in acting to create new experiences."




This can be applied to a game scenario much like Bloom's Taxonomy can, however its fewer number of stages can leave interpretations to be more open. However, in order for Kolb's model to be effective, Kolb stated that "the learners ... need four different kinds of abilities". These abilities form the basis Kolb's Learning Style Inventory. The abilities consist of "abstract conceptualisation", "active experimentation", "concrete experience", and "reflective observation". These four abilities combine to create four distinct learning styles that tackle handle experiences in different ways, dependant on their strengths. A "Converger" uses abstract conceptualisation and active experimentation in practical application of their theories. A "Diverger" uses concrete experience and reflective observation to create theories from different perspectives. An "Assimilator" uses abstract conceptualisation and reflective observation to create theoretical models. An

"Accommodator" combines concrete experiences and active experimentation to take the most pragmatic approach to experiences. These learning styles can be used to look at emergent sequences of gameplay, gameplay that lies outside of the structured gameplay within tutorials.

## Methodology

Case studies were made of four video games for the lenses to be applied to. The games in question were selected to provide a range of tutorials from multiple genres, platforms, and complexity. The researched games consisted of *Super Mario Bros.* (Nintendo R&D4, 1985), *Super Meat Boy* (Team Meat, 2010), *Halo 4* (343 Industries, 2012), and *Dota 2* (Valve Corporation, 2013). Each game analysed was chosen as they formed a spectrum of complexity in which the lenses of methods of learning were applied and tested. Through beginning discussion at the end of the spectrum with more simplistic games, the rise in complexity and changes in genre meant that the reader was met with ideas that evolved through each game. *Super Mario Bros.* and *Super Meat Boy* are both platforming games, with the latter being the more complex of the two. Both *Super Mario Bros.* and *Super Meat Boy* were also chosen as their ideas on teaching the player how to play have been documented through games journalism and in *Super Meat Boy*'s case, film, as it was one of three games featured in *Indie Game: the Movie* (2012) during its development. *Halo 4* was chosen as it is a science fiction first-person shooter that bestows abilities on the player in a sandbox that contains varying types of enemies and weapons, which all needs teaching to the player thus providing the research with a case study that involves a player playing in 3D space. *Dota 2* provided a case study that

exemplified a high complexity game to analyse. *Dota 2* is a multiplayer online battle arena that blends role-playing game elements such as spells that affect a character's gameplay and unique character classes with real time strategy gameplay in long ten player matches. The reason why *Dota 2* stood at the high end of the spectrum is because of the depth of learning within it, as different characters in a match can synergise with others whilst other characters work in specific roles that have a large number of mechanics to be learnt within that role. One can argue that using case studies as the primary form of investigation was not the most effective method for analysing the games in question. Through a narrowed scope, exclusion of other titles and genres was unavoidable, which in turn signifies that there could have been a more appropriate collection of titles to analyse. However the titles picked were titles that either had enough documentation and commentary about their design or were games that provide diverse scenarios to analyse.

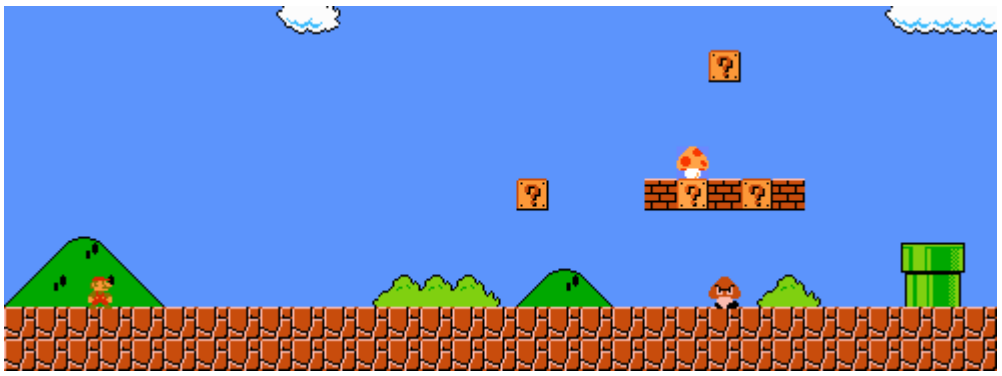
## Discussion

In order to have gained an understanding in how the selected titles teach their mechanics to a player, lenses were constructed from each of the theories and ideas created by Petty, Bloom, and Kolb, and then applied to scenarios within the titles to create case studies.

*Super Mario Bros* was the first title analysed, more specifically its first level, "World 1-1". In a video published by Eurogamer, *Super Mario Bros* creator Shigeru Miyamoto

described this level as being built in a way that "[the player] can learn what the game is all about". When the player starts the level, Mario is positioned on the left hand side of the screen with objects to the right of him. *Super Mario Bros.* uses the composition of the level to suggest what the player does next, chiefly to move right to progress.

Upon moving, the player will encounter the "Goomba" enemy. Through application of Petty's idea of Guided Discovery, the introduction of the Goomba provides a foundation for all learning within *Super Mario Bros*. At such an early stage, failure to learn a mechanic for the first time wasn't penalised heavy due to this mechanic appearing at the very start of the game, which creates Petty's controlled environment where each failure can provide a key piece of information for the player to understand.



In this scenario this encounter with the Goomba is built to provide several beneficial outcomes in the player's learning experience, if the player gets hit by the Goomba they die meaning that one hit will kill them in that state, jumping over the Goomba results in progression, and jumping on the Goomba kills it and provides progression, if the player jumps over the Goomba under a "Question Block" then player will discover how Question Blocks hide collectibles and power-ups.

*Super Meat Boy* employed Petty's idea of Guided Discovery to teach players about

every mechanic of the game and each way that mechanic can be applied. Edmund McMillen *(Indie Game: the Movie, 2012)* describes such situations when discussing his ideas on level design. McMillen states that *"*every level in the first chapter needs to have some example forcing the player to do something in order to beat the level that they will need further in the game". An exemplar of this comes in the form Level 1-3 in *Super Meat Boy,* a level named "The Gap". In this level, there are two platforms and the titular gap separating them. McMillen describes the purpose of this level is to teach players how to combine running and jumping into a longer "sprint jump".

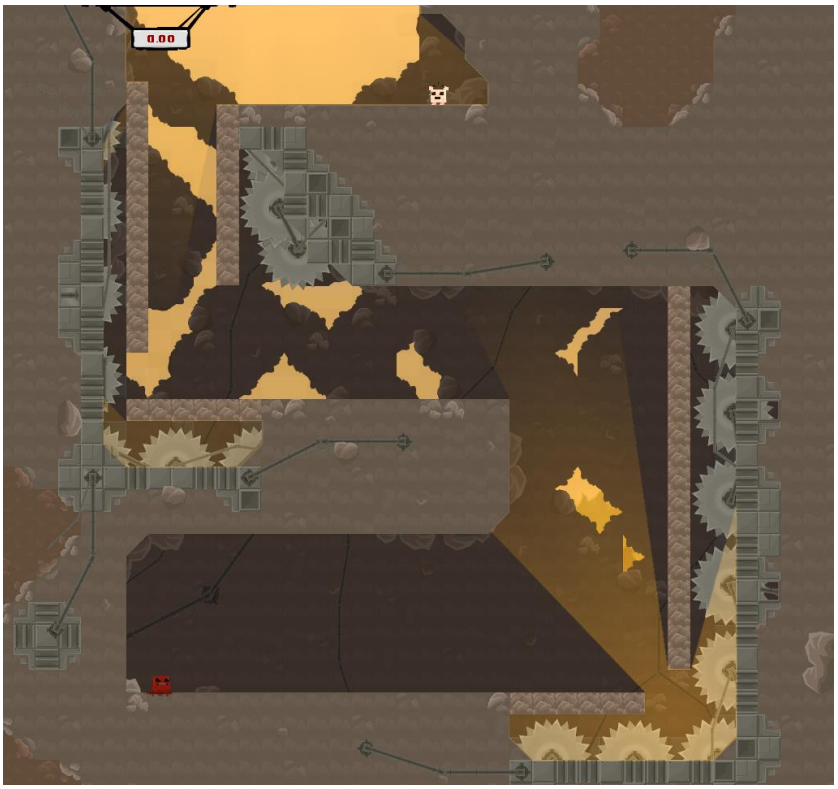

"The Gap" is designed so that the only solution to clearing the level is to sprint jump, and in failing to sprint jump merely resulted in a restart of the level. Due to the size of the level and penalty for failure being small, "The Gap" became the safe environment for discovery that Petty describes as key to Guided Discovery. With the only solution being a "sprint jump", McMillen further described the level as "[making] sure the player

understands in order to get over big gaps that you need to press and hold the run button and jump".

The lens of Petty's Art of Explaining was applied to further levels in the first chapter of *Super Meat Boy* as McMillen described the lessons behind harder levels in the chapter. The example McMillen provides is Level 1-8, "The Bit".


Once again the solution to clear the level involves the sprint jump mechanic, but it is presented in a new way to see if the player has learnt how to recognise where a sprint jump is needed, thus forcing the player to build upon previous knowledge of the game to progress.

The Art of Explaining can be seen in many levels from Level 1-8 onwards, as levels begin to force the player to use multiple mechanics in quick succession. For example, Level 1-9 "Safety Third" introduces block that dissolve after the player has stepped on them, and throughout the level, introduces them in varying situations such as combining them with running, and wall-jumping.




McMillen crafts levels this way because he states that “all these mechanics are important and each level is another level that pushes that ... it’s me teaching the player that: ‘You can do this.’”

McMillen applies Petty’s Art of Explaining to the introduction of mechanics in a level too. In *Indie Game: the Movie (2012)*, McMillen uses saws as an example within *Super Meat Boy*. The first introduction of saws is in Level 1-6 “Bladecatcher” which are static saw blades that spin in place, showing the player that a saw can kill Meat Boy and must be avoided for the sake of progression.


1-6 Bladecatcher 1-13 Tommy's Cabin

These saws, that the player understands how to interact with, are then built upon in Level 1-13 "Tommy's Cabin", as the sawblades now move horizontally and vertically. The blades themselves have not changed, instead, the way are utilised have changed which takes the previous knowledge of the player with regards to saws and applies it in a new situation to help the player learn about the new ways in which saw blades can function in a level.

To break from the 2D Platforming genre, *Halo 4* was the third title under scrutiny. In each Halo title up to *Halo 4*, including *Halo: Combat Evolved*, *Halo 2*, *Halo 3*, and *Halo 3: ODST*, movement in a 3D space must be taught to the player, and each game teaches it in the same way. The games have the player learn how to look first, as the player's camera dictates the direction of movement. Each game has the player locked in a static position and is instructed to look in four different directions. Once completed the player is given freedom to move around and get acclimatised to controlling the player character.

The way each game engages the player is by making those actions a part of the universe the player is in, as the camera aiming tutorial has the player calibrating their power armour or activating a cryogenic pod's manual release mechanism.


*Halo 4*'s camera aiming tutorial incorporates Petty' Teacher Talk to further enhance the player's immersion into the world. In Teacher Talk, Petty states that Teacher Talk is a lot more effective if the talker is enthusiastic and such a talker is present in the form of the player's companion "Cortana". Cortana talks directly to the player, instructing them through the cryogenic pod's manual release mechanism that is activated by looking up, down, left, and right.

Once that stage is complete, the player is then freed into a space that allows them to understand the controls in a new way, much like the previous Halo games. Through providing a safe space for the player to understand their controls, not only is the player subjected to the learning behind Petty's Art of Explaining, but the player can progress with the knowledge needed to play *Halo 4* with ease.

Further into the mission, *Halo 4* introduces new weapons that have not previously existed in the Halo games. To provide an opportunity for the player to learn how to use these weapons, there is a lack of ammunition for the player's default weapons. When the player runs out of ammunition, the new weapons are available to be claimed from the enemy. Having learnt how to move and shoot successfully, the game forces the player out of their comfort zone into trying a new experience that is based on knowledge previously attained. In doing this, the game uses a combination of Petty's Art of Explaining and Guided Discovery to show how the player can acquire new weapons and use them successfully.

*Halo 4* continues the use of the combination of Petty's ideas to introduce new enemies to the player. The "Jackal" is one such enemy, a bipedal enemy that uses an arm-mounted shield to block incoming damage, and is introduced in an environment that forces the player to directly tackle the Jackal and identify its weaknesses as it is positioned in a doorway with the Jackal blocking progress to the next area of the mission.

Some enemies in Halo have a layer of armour that blocks a limited amount of damage before the enemies take health damage. The Jackal doesn't have that layer of armour, meaning that it can be killed with a single precision weapon shot to the head, but the shield is in the player's way. To eliminate the Jackal, the player learns to, first, make the Jackal lower its shield which is achieved by inflicting damage on the Jackal's body by shooting through the sides of its shield, and then landing a precision shot to its head or multiple shots to its body. During the Jackal's introduction, the player's learning process can be expressed with Bloom's Taxonomy. In stage one the player will identify the Jackals with their target reticule turning red to indicate the Jackals as enemies. In stage two the player will see the Jackal and its body exposed by parts of its shield. Stage Three, has the player fire at this exposed area, making the Jackal drop its shield. Stage four has understanding that they can drop the Jackal's defences by dealing damage to its body. The fifth stage has the Jackal being eliminated by the player, unblocking the path ahead. The player's evaluation of the experience, is that the Jackal's shield must be lowered to kill it.

The final title analysed was *Dota 2*. *Dota 2*'s tutorial is built to give the player a

grounding knowledge of *Dota 2*'s basic mechanics. *Dota 2*'s tutorial features a narrated scenario in which the player is given the character "Dragon Knight" to learn how to control a character in the game. Dragon Knight is a melee character with abilities that focused on dealing damage to a single target, with the point of the tutorial being to teach the player how to move the character, attack with the character, earn gold, spend gold, and use abilities. To accompany the text instruction, a voiceover narration provides embellishment on the player's actions, building the world around them. This is a form of Petty's Teacher Talk as the announcer speaks to the player with enthusiasm and the intent to immerse the player, much like Cortana's role in *Halo 4*'s tutorial. It is also supplied in another form through character dialogue as all of the characters in *Dota* 2 have their own voices and story, exclaiming about events that occur in gameplay. Although used for embellishment, these character voices can help the player get used to a character by having a personality for the player to relate to. The voices are also used to notify the player of key events, such as structure & objective damage, and player kills.

After establishing a basic set of skills for the player to use, *Dota 2*'s tutorial changes the character the player must use to progress, a character named "Sniper". This next stage of the tutorial leaves the player to use the skills that they've learnt in a completely new scenario, as Sniper's core gameplay is about attack from range. In using Sniper, the player will learn more advanced mechanics such as Area of Effect abilities, using the game's minimap, the courier and stash, and towers. This part of the tutorial expects the player to use what they've learnt without prompts, so that the main focus is to understand the larger objective of a *Dota 2* that is to siege towers and march upon the enemy base. In forcing the use of prior knowledge, the tutorial brings in ideas from Petty's Art of

Explaining to reinforce ideas set by previous stages of the tutorial.

Upon completion of that tutorial stage, the next stage pits the player against an easy computer controlled enemy character in a smaller version the game's standard environment, building further on having the tutorial putting an onus on the player to consolidate their knowledge for use in a new experience that will expand their knowledge of the rules of *Dota 2*. The player controls Sniper and is put against character called "Axe" who is similar to Dragon Knight, a character the player is familiar. By using a character the player is familiar with to fight against, the player is still using their previous knowledge in new experiences.

The larger lesson being taught in this tutorial is how *Dota 2* works on a match to match basis. *Dota 2* analyst and commentator Liu (2014) in the documentary *Free to Play* describes *Dota 2* as "a combination of … soccer and chess" with *Dota 2* commentator Dawson (2014) adding that "[*Dota 2*] is a game of momentum. You as five players battle against the other five players' momentum." The objective of a *Dota 2* match is to destroy the enemies' Ancient. The only way to siege the Ancient is by assisting computer controlled units destroy a series of defensive turrets that line the three 'lanes' linking the player's Ancient to the enemies'. This tutorial teaches the player how generate momentum in a match and push with their units through the enemy to their first lane turret, hence the tutorial's decision to use the character "Axe" as the player's opponent. As the player is still using Sniper, they have the advantage of ranged attacks, meaning that they can easily generate momentum by eliminating enemy units from afar with quick attacks, but Axe is a character who excels at close quarters combat with abilities that force their target to focus Axe giving him the chance to deal high damage up close.

One such ability forces its target to attack Axe for a period of time, "Berserker's Call", proposing a breakdown of the player's learning through Bloom's Taxonomy if the player is subject to being targeted by this ability. Stage one has the player identifying Axe as an enemy. This is done through Axe having a red health bar in contrast to the player's green health bar. Axe also has a red circle surrounding him, signifying Axe as an enemy, and the player's cursor will outline in red when hovered over Axe. When Axe casts Berserker's Call, a red wave of energy pulses outward, this forms stage two, with the player linking the ability to the particle effect. In stage three, the player begins to uncontrollably attack Axe, whilst red energy emanates from the player's character. Stage four has player beginning to understand the ideas around Berserker's Call, such as its range, its effect on the player, and any call-out sign that Berserker's Call is going to be cast. In stage five, will have the player link the ability to impeding their momentum if Axe gets too close. Which leads to the final stage where the player gains the understanding that they must keep their distance from Axe if they wish not to be disabled and tip the balance of momentum towards Axe.

Such knowledge about abilities can also be gleaned through reading. *Dota 2* boasts a roster of 110 different characters to play, each with their own roles and abilities. Petty's different levels of reading in his Reading for Learning structure can be applied to *Dota 2* when referring to a player reading into a character and their abilities, with each level of Petty's Reading for Learning applying to multiple facets of any character in *Dota 2*'s roster. For example, referring back to the characters of Dragon Knight and Sniper that were used in the tutorial, their abilities and statistics can be read to fit within Petty's

structure. Every ability, item, button, and statistic can reveal further information about their respective capabilities by having the player hover their cursor over it. So with Dragon Knight's first ability, "Dragon Breath", the player will reveal information about the details of the Dragon Breath when hovering over the icon for its activation. Upon doing so, the information reveal will contain a description of the ability, it's damage and damage type, any other effects such as stunning (making an enemy unable to execute any action for a period of time), what types of unit the ability affects, its mana cost, and its cooldown timer. This is sizeable chunk of information to take in a glance, so key points of that information are highlighted. At Petty's "Surface-level Processing" the reader wants to read the bare essential information, and *Dota 2* does so by having the current damage their ability deals, mana cost and the time it takes for the ability to be cast again as they are highlighted in gold text, so the player can quickly see and understand those key pieces of information.

If all of the above tutorials and lessons have worked and helped guide and teach the player, then the developer has successfully built a platform upon which emergent gameplay can be fully enjoyed by the player. Emergent gameplay is gameply that, in essence, emerges. It is not scripted or planned, but combines elements and structures within the game to create new scenarios and experiences for the player to learn from. Emergent gameplay is rife within multiplayer games because of the human element behind the play at hand, a game cannot script another player's actions, so lessons learnt outside of the tutorials are entirely down to the player to tackle. As aforementioned, *Dota 2* has a roster of over 100 different characters that synergise, pair up, and counter each

other in many different ways which is barely scratching the surface when a match involves buying items to better your character, and a whole meta-game about momentum. Every possible interaction isn't taught in *Dota 2*'s tutorials, so the game equips the player with knowledge to understand the foundation of *Dota 2*'s gameplay with the onus on learning through emergent gameplay. These interactions can be expressed through the application of Kolb's Learning Style Inventory to theoretical scenarios during a typical match of *Dota 2*.

"Ganking" is a tactic in *Dota 2* in which a group of players will ambush key players of the enemy team. A successful "gank" means that the team subjected to it lose momentum through a key player being eliminated. To prevent further ganks, players could stay within certain areas of the environment that will allow for them to spot a potential gank, or keep an eye out for when the players responsible for the gank look like their moving towards them on the minimap, effectively erring away from accidentally reproducing the events that lead up to being ambushed. This is an example of an Assimilator's process of handling this experience, creating a theoretical model that takes into account the details of the ambush, and apply it to prevent further occurrences.

The players who committed the ambush can be described as displaying the thought processes of an Accommodator, as Accommodators are practical applicators of their ideas, but more importantly they are risk-takers. In a match of *Dota 2*, a gank is a risk. If it fails then the intended affect of impeding the enemies' momentum is now applied to the ambushers. Where Accommodators will excel is in the trial-and-error aspect of ganking. If a gank doesn't work out and ends with neither side losing momentum then the Accommodator will take that practical experience as a guide for the next attempt. If the

next attempt fails then their theory is modified and reapplied in a new situation.

The abilities demonstrated in *Dota 2*'s tutorial have involved either targeting a single unit or applying an area of effect, but some characters have abilities that can be defined as "Skill-shots". These abilities rely on the player's ability to predict an enemy's movement or actions to successful land the shot. The player must first activate the ability and the click the direction in which they want to send the ability. Such an ability is "Meat Hook" that belongs to the character "Pudge". A successful Pudge player can use Meat Hook to pull enemy players to Pudge and deal damage, and to do so requires the player to theorise where an enemy could go and then act upon that theory. Such players could be considered Convergers under Kolb's Learning Style Inventory, as Convergers take a pragmatic approach to the ideas they create from a concrete experience.

Throughout the tutorial, *Dota 2* has chosen the player's character for them ans structured the opposition around that character. Once the player has left the tutorial then they must pick their own character in each match they play. When a player picks a character they must make sure that their character synergises with their team's characters, whilst countering the characters the enemy team have picked. Through playing matches and experiencing new characters, players being to form ideas about every character they encounter, which becomes part of their reasoning when choosing their character in the next match. They will be able to draw from past experiences to inform their choice in picking the best character for the team compositions in the match, an example of the thought processes behind a Diverger's thinking process with new experiences.

## Conclusion

When designing and developing a game, the developer must understand that everything in the game must be learnt by the player. Within the bounds of the game that is being made, a developer will become a teacher, and the research clearly demonstrates that games are able to teach anything to the player, and are also able to keep the player learning and developing. This has been shown through games as early as *Super Mario Bros.* where memory restrictions meant that the game could only teach through gameplay, and games as complex as *Dota 2* where a solid foundation of knowledge was taught to the player to allow emergent gameplay to keep the player learning and evolving through every singe match played. These are lessons that games could teach on their own, but the research has shown that the understanding of learning and education theories can make those lessons more powerful and provide room for developers to craft scenarios that benefit a player's learning experience. Using methods such as allowing the player to discover mechanics of their own volition, and reiterating previously learnt lessons in a new way to teach new mechanics in conjunction with common sense game design, any developer can craft an experience that anyone can pick up, play, and become invested in, because the game puts the learning in the hands of player.

References

Darvasi, P. (2015) *Ludic Learning - Play To Learn, Learn To Play* Available at: http://www.ludiclearning.org/ (Accessed 19 November 2015)

Eurogamer (2015) *Miyamoto on World 1-1: How Nintendo made Mario's most iconic level* Available at: https://www.youtube.com/watch?v=zRGRJRUWafY (Accessed 20 November 2015)

Bibliography

Petty, G. (2009) *Teaching Today* (Fourth Edition) Oxford: Oxford University Press

Willingham, D.T. (2010) *Why Don't Students Like School?* San Francisco: Jossey-Bass

Bartlett, S.; Burton D. (2007) *Introduction to Education Studies* (Second Edition) London: SAGE Publications Ltd

Anderson, Lorin W.; Krathwohl, David R., eds. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives.* Allyn and Bacon.

Bloom, B. S.; Engelhart, M. D.; Furst, E. J.; Hill, W. H.; Krathwohl, D. R. (1956). *Taxonomy of educational objectives: The classification of educational goals.* New York:

David McKay Company.

Kolb, D. A. (1981) *Learning Styles and Disciplinary Differences* United States: The Modern American College

Gameography

Nintendo R&D4 (1985) *Super Mario Bros.* (Edition Standard) Nintendo Entertainment System [Computer Game] Nintendo

Team Meat (2010) *Super Meat Boy* (Edition Standard) Xbox 360 [Computer Game] Microsoft

343 Industries (2001) *Halo: Combat Evolved - Anniversary* (Edition Standard) Xbox 360 [Computer Game] Microsoft

Bungie (2004) *Halo 2* (Edition Standard) Xbox [Computer Game] Microsoft

Bungie (2007) *Halo 3* (Edition Standard) Xbox 360 [Computer Game] Microsoft

Bungie (2009) *Halo 3: ODST* (Edition Standard) Xbox 360 [Computer Game] Microsoft

343 Industries (2012) *Halo 4* (Edition Standard) Xbox 360 [Computer Game] Microsoft

Valve Corporation (2013) *Dota 2* (Edition Standard) PC [Computer Game] Valve Corporation

Filmography

*Indie Game: the Movie* (2012) Directed by James Swirsky, and Lissane Pajot [Film] United States: BlinkWorks Media

*Free to Play* (2014) Directed by Valve Corporation [Film] United States: Valve Corporation