

Using Meaningful Gamification to Design an Integrated Unit of Work



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As part of undertaking a depth unit in instructional design, we were given the opportunity to design a unit of work that incorporates an online environment. Our broad goal was to create a unit of work for the upper primary years, integrating the humanities and literacy subjects. Our teaching and learning philosophies led us to explore GBL (Game-Based Learning) and other learning areas, modelled on games.

A key feature of games is a reward-based system. To create such a system, game designers must decide what actions within the game are desirable and assign a particular reward/s for those actions. Such a reward system may utilise points, leaderboards and badges. The employment of these features in non-game contexts has come to represent Gamification (Nicholson, 2012). Simply put, Gamification is learning that utilises game features, without being completely housed in a game. We were attracted to the inherent flexibility of Gamification and the ability to blend together online and offline learning tasks.

Of particular interest to us is the area of Meaningful Gamification. In contrast to Gamification, Meaningful Gamification assumes a more humanistic approach to decision-making; that people may have a more intrinsic motivation for engaging in certain behaviours. Meaningful Gamification does

not depend on employing an external reward-based system to motivate players. Designers must therefore use other design structures, tools, mechanisms etc. to motivate students.

“Meaningful” is based on Mezirow’s (1991) model of transformative learning, where individuals have an intrinsic connection to a new experience or information that can lead to a transformation of beliefs and long-term change. What is meaningful is of course defined by each individual and is too personal and complex for teachers to ascertain for the purposes of design.

Nicholson (2012), however, provides a recipe for teachers wishing to employ Meaningful Gamification in their classroom; play, exposition, choice, information, engagement and reflection. According to Nicholson (2012), if opportunities for these elements are built into the design of a unit, teachers are more likely to achieve Meaningful Gamification.

Whilst it may be easier for designers/teachers to gamify learning environments using external reward systems, providing students with opportunities to make meaningful connections results in deeper, sustainable student learning.

We set ourselves the goal of designing an integrated unit that provides these opportunities for students, by following Nicholson’s (2012) recipe.

Framing our Unit as an Alternate Reality Game

One of the most appealing features of video games is that they provide students with a virtual world that is immersive and engaging (Barab et al., 2009). Offline tasks associated with these games often consist of students completing written tasks about what they have done in those games (Maguth, List & Wunderle, 2015). In contrast, a gamification framework presents the challenge of merging the online world with the real world. We wanted to offer students a range of offline resources and tools to draw from, in conjunction with online ones. This reflects the belief that the 'game' does not simply stop just because students have logged off.

We recognised an opportunity to make use of the real world using an Alternate Reality Game (ARG). According to Nicholson (2012), an ARG is an example of meaningful gamification. ARGs use game elements to tell a story that is based upon a non-game setting. The emphasis is on an engaging story that arouses curiosity and allows participants to interact with the ARG in a variety of ways. Additionally, the narrative simulates real events, giving students the opportunity to apply and practice problem-based learning (Barab et al., 2009). Further, community-based aspects enable participants to find meaning through group engagement (Nicholson, 2012).

McGonigal (as cited in Nicholson, 2012) believes that good ARGs present obstacles within a narrative with a wide scope. A broad narrative allows more room to create fictional events and characters, clues and prompts to engage, challenge, guide and scaffold student learning. This provides more opportunities for students to make meaningful connections.

Design Considerations, Choices and Reasoning

We started our planning by identifying three core components; content, communication & collaboration, and assessment. Our design considerations would feed into these components. Then, we identified three design priorities that would be the driving forces of our design. These were flexibility, social-constructivism and student motivation. We wanted these to have a strong presence across our design and be prioritised when making decisions. Although these areas are interrelated, they each drive the design in a significant way and contribute towards achieving meaningful gamification.

Flexibility

Consistent with Collis and Moonen (2002), we designed a unit that is flexible and student-centred, and defined what this meant in our planning stages. For our project this meant flexibility in learning activities/tasks. That is, we wanted the

students to choose how they learn. Our unit does this in the following ways:

- Providing a variety of on and offline tasks (quests) that cater to as many students as possible, enabling students to exercise autonomy of choice. This is consistent with Universal Design for Learning theory (Nicholson, 2012).
- Providing open-ended quests so that students decide how they demonstrate their learning.
- Providing students with the option of creating their own quests.

Social-Constructivist Theory

Another driving force behind our project that is manifested in our design decisions is Vygotsky's (1978) social-constructivist theory. We recognised an opportunity to align this theory with our gamification framework by sequencing our unit of work in accordance with the inquiry learning process. An inquiry framework complements curriculum integration, particularly in the humanities (Gilbert & Hoepper, 2014).

Additionally, inquiry is an organic process within a game-like learning scenario, where players can pose questions and investigate situations. Internet-assisted inquiry, such as WebQuests provide prompts for exploration, investigating alternative ideas, and stimulates students to learn autonomously (Lin, Liang & Tsai, 2012).

As ARGs promote active and experiential learning, they create an ideal environment for inquiry learning, through active and experiential learning. Adopting the inquiry model further shaped our unit by allowing us to sequence narrative scenes using the stages of inquiry as a guide.

We aligned our narrative with three broad stages of inquiry; posing questions & planning, finding out, and concluding, reflecting & responding.

The Framework
- Aligning the Story with the Inquiry

Stage 1: Posing Questions and Planning (Green Quests)

Focus:

History and Geography:

- Asking questions and investigating character time period and origin
- Asking questions and investigating the Australian bush and Indigenous connections to land

Literacy:

- Creating character narratives linking to relevant historical and geographical information

Narrative:

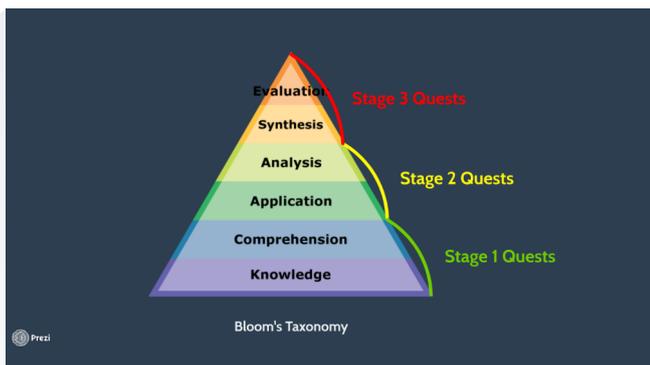
Following the introductory video, students investigate the abductees and help them to learn about each other and about how to survive in the Australian outback. Each character is from a different time period in history and different societies, culture, religion etc.

In the parallel universe the abductees were isolated from each other, so they are only learning about each other now for the first time, in the Australian Bush. They know nothing of each other or of their new land. Their first experience will be learning about each other through their objective of survival in the bush with shared hopes to reunite with people and a community, and learning about all they have missed.

It comes to light that exposure to extraordinary levels of radiation in the parallel universe has affected their memory of their past lives. Each of them carries with them only a few memories to help them on their journey. Further, they each only have a few items on them that they have kept since the time of their abduction (e.g. photographs, tools, currency). These will surely help them in their journeys.

Prezi

With each new stage of inquiry comes new quests, new perspectives, new questions and new ways of thinking. Additionally, segmenting the unit in this way provides clear points of progression to assess student learning.



This allowed us to design tasks considering students' different levels of thinking based on Bloom's (1956) Taxonomy.

Motivation

Given our decision to use a meaningful gamification framework, our decision to include certain game features in our design became just as important as our decision to exclude certain game features. For example, the decision to exclude extrinsic rewards, such as points and badges is a significant one. Rather than rely on such extrinsic motivation, we wanted students to make meaningful connections with the unit (Nicholson, 2012). It was crucial to articulate specifically how we would achieve this. We did this through the following features:

- Student choice, and the ability to customise characters and create content within the narrative provides students with a sense of autonomy and control over their learning that increases motivation (Nicholson, 2012).
- An engaging narrative that unveils new information, characters, clues and mystery visitors.
- Multimodal technology and Connectivism using social media tools.

Clues are a key source of motivation in our unit. In contrast with a point/rewards systems, clues provide a sense of fun but are not dependent upon levels of performance. This is in line with Nicholson's (2012) definition of Meaningful Gamification. Students receive clues after completing each stage of the inquiry and each clue helps students with the subsequent stage of inquiry. Clues thereby act as intrinsic rewards that motivate students to progress through the inquiry process in a meaningful way.

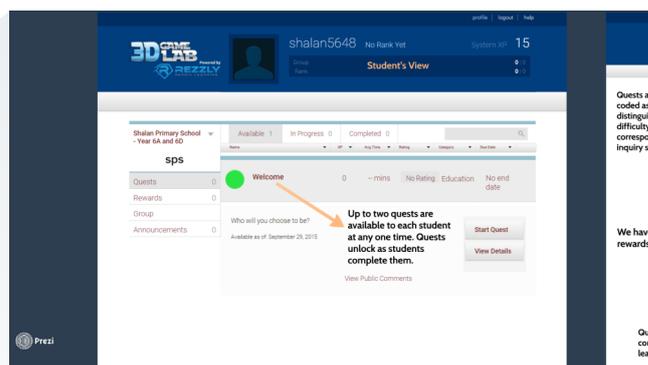


An example of a clue tied into the unit narrative.

Content: Quests, Instruction and Multimedia

Online Platform

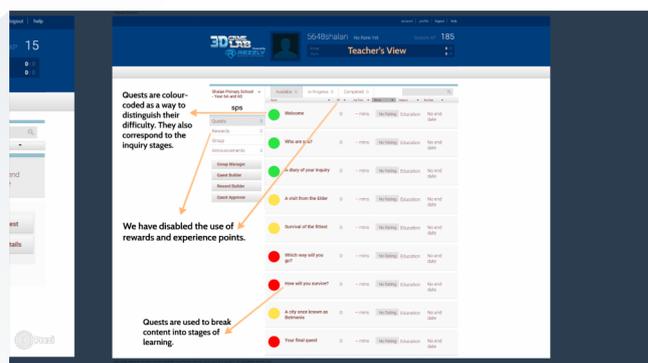
Acting as a gateway into the online world, we used a gamified Learning Management System (LMS), 3D GameLab, to present stimuli, provide instructions, present multiple learning pathways, track student learning and provide feedback and assessment.



In this space, students communicate, collaborate and explore multiple resources as they complete quests individually and in groups.

Quest-Based Content

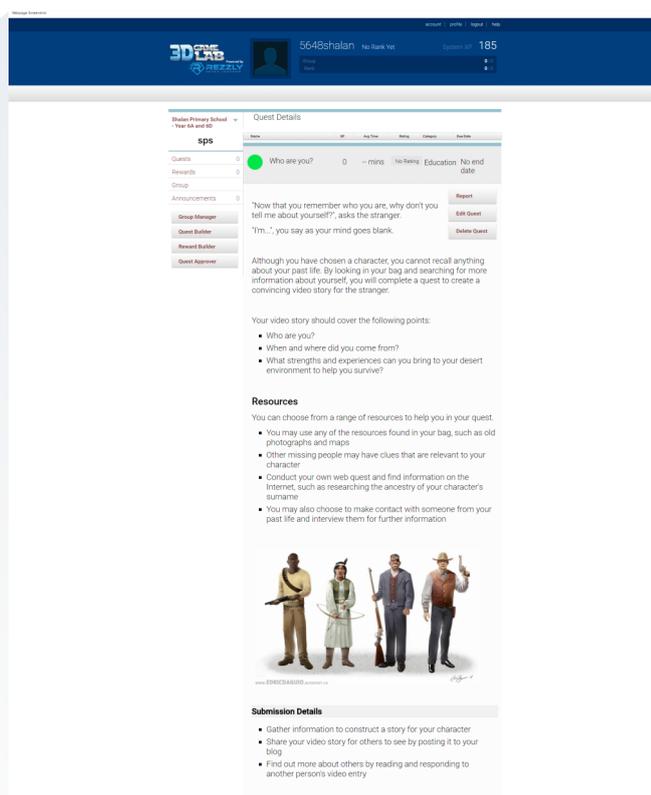
We segmented curriculum objectives into various tasks or quests, allowing us to identify student needs and provide appropriate scaffolding. Quests helped us to organise the content of the unit and complemented the inquiry learning model (Vygotsky, as cited in Hmelo-Silver, Duncan & Chinn, 2007).



Traditionally WebQuests guide students to locate and explore information that is often entirely online (Gilbert & Hoepfer, 2014). We endeavoured to build upon past research by finding opportunities to make our unit more immersive and engaging in offline settings. We used Barab et al.'s (2009) work on Quest Atlantis as a model. In Quest Atlantis, students complete quests that reflect real-life scenarios within a virtual world. Additionally, we incorporated a variety of multimedia tools, including elements of augmented reality. For example, we explored Aurasma and Geocaching. These technology tools provide another dimension of understanding to class posters, maps, timelines and character charts.

We designed all quests to be authentic (students complete tasks that reflect real world settings), with embedded choice (students are motivated to learn because they choose what they want to do) and elements of play (students can explore real world challenges with imaginative thought).

By providing a range of quests and ways to complete them, the unit caters to Gardner's (1991) multiple intelligences and enables students to exercise their personal preferences (Gilbert & Hoepper, 2014). This is also a way of differentiating content and allowing all students to complete the unit, by following their own unique learning pathway.



Stage 1: Posing Questions and Planning (Green Quests)

Instructional Content

Incorporating an online world into our design presented many considerations and challenges. Giving students the ability to navigate through their own learning online requires a great deal of thought be put into the way students are presented with information and instructed to complete tasks.

Our unit is both delivered and understood in multiple forms, including verbal and non-verbal modes. This assists students to create more useful mental models and caters to learning styles and intelligence profiles of a greater range of students. Our unit draws on a range of research relating to online content, including but not limited to the following:

- Sweller's Cognitive Load theory (as cited in Paas, Renkl & Sweller, 2003)
- Mayer's (2009) Principles of Instructional Multimedia
- Henderson and Henderson (2006)

Instructional Multimedia Content

Following Mayer's (2009) Multiple Representation principle, we designed for the incorporation of multimodal presentation within quests. Our goal was to enhance student interest whilst reducing students' extraneous cognitive load (Paas, Renkl & Sweller, 2003). We did this through a combination of the following:

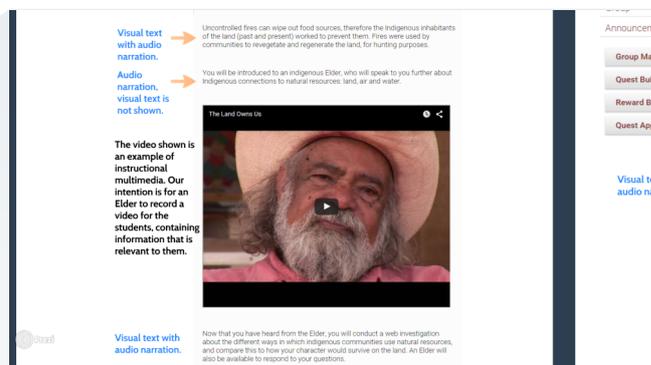
- Narration
- Instructional animation videos
- Instructional character videos (e.g. by the teacher, an expert or a fictional character)

Instructional Audio and Narration

We used a conversational style in our narration of quests, advocated by Mayer's (2009) Personalisation principle. Providing audio narration and employing character voices decreases students' extraneous cognitive load as they do not have to read on-screen text.

Instructional Animation and Character Videos

Animation videos engage the students and arouse curiosity. We segmented audio/visual information to make it easier to view and to build suspense, rather than present blocks of text for students to read.



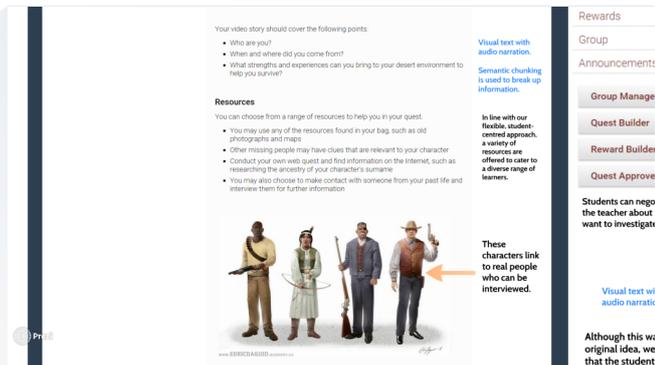
In terms of user control, our intention was to host all of our video content on YouTube so that students can pause, skip, rewind, speed up and slow down to their own preferences. Giving users control over their presentation leads to a better level of comprehension in comparison to fixed settings (Mayer and Chandler, 2001).



Content Design Principles

The format of quests is consistent and draws on content design principles discussed by Henderson and Henderson (2006), including:

- Semantic chunking, used to group together key information
- White Space
- Minimal colours, fonts, font sizes

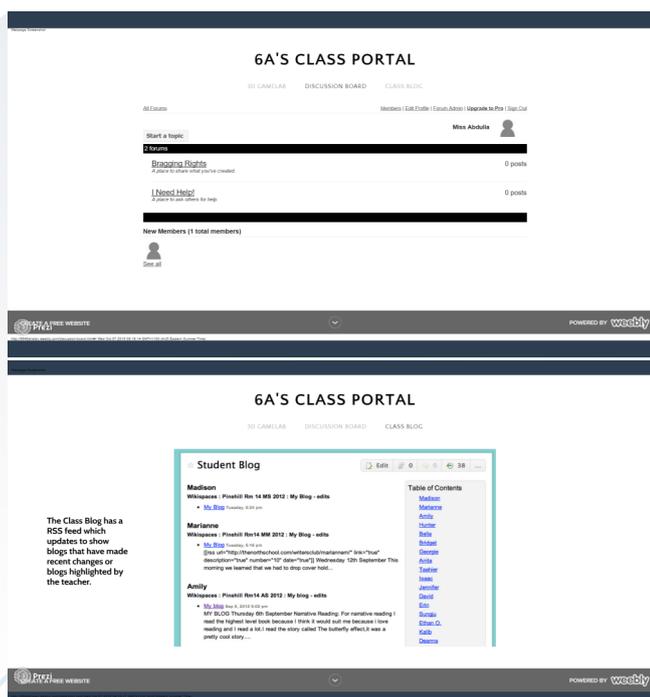


The 3D GameLab platform helped guide our content design by disallowing us from using too many colours, fonts and font sizes. Our quests promote readability through minimising unnecessary text and leaving space between our key ideas.

Communication and Collaboration

Interdependence of Learning

Communication and collaboration is a key component of our design that was considered in the earliest stages of our project. Firstly, we recognised the need to create a sense of community that would translate across the inquiry unit, in both online and offline worlds. We created an online space for students to communicate and collaborate through a Class Portal.



The facilities within the Class Portal, including 3D GameLab, discussion board and class blog, provide a private space for student-teacher dialogue, as well as a public space for both teacher-student and student-student dialogue. The Class Portal is a safe, contained environment, similar to Gee's (2013) analogy of a 'sandbox'.

Our design choices with respect to communication and collaboration reflect a loose alignment between Salmon's (2002) 5 stage model and our inquiry model. For example, in the initial stage of inquiry, quests require characters to familiarise themselves with the Class Portal's facilities and each other. In the later stages, the narrative requires students to knowledge-share and problem-solve together.

Consistent with inquiry, quests are designed to promote a participatory and contributory-oriented pedagogy in the following ways:

- Collaborative quests with students working in pairs or groups as 'guilds' (e.g., completing a map quest for resources, completing the class summative assessment etc.)
- Interdependent quests - students must knowledge share using Web 2.0 tools and augmented realities to progress through the inquiry

Rather than have the students respond to each other's blogs or forum posts after they have completed quests, we wanted quests to foster student communication and collaboration whilst students are questing. In line with our social constructivist approach, we wanted collaboration to influence perspectives and mould learning. The unit also gives students the choice to form alliances with other characters if mutually beneficial and request to work together.

Social Media Tools

The main communication and collaboration tool in our design is social media. This is due to the important inquiry aspect of community, connectivism and collaboration. Drawing upon Kaplan and Haenlein's (2010) definition of social media, its role in our design is to allow the creation and exchange of User Generated Content. In some instances, quests direct students to use particular social media tools, whilst in others students have a choice of social media tools. A list of example social media tools utilised in our unit follows.

- Blogs (e.g., Hosted by Wikis)
- Microblogs (e.g., Class Twitter account)
- Wikis
- Discussion forums
- Video sharing (e.g., PowToon, YouTube)
- Image sharing

Social Media plays a significant role in students navigating their way through the narrative of our unit. As students remain in

character throughout the unit, much of their communication and collaboration is essentially role playing. This pedagogy is particularly beneficial for the humanities and literacy (Gilbert & Hoepper, 2014). Social media tools help the students' characters create and share content, and role playing provides students with a safe and fun space to ask questions and offer help to others.

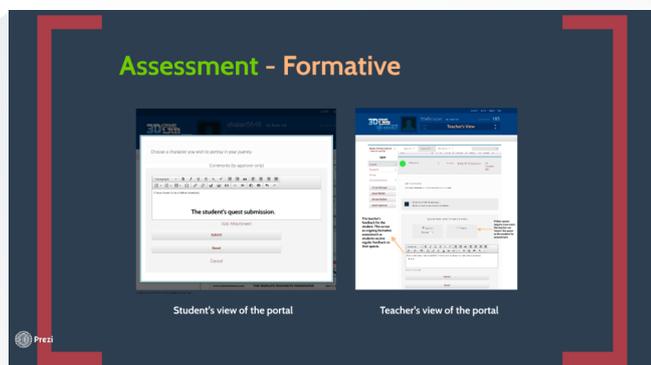
Additionally, we designed social media tools for teacher instruction, feedback and assessment.

Assessment

We aligned the assessment with the learning tasks, resources and supports provided in the unit. Our core influences of flexibility, gamification and inquiry naturally created an ideal environment for an authentic assessment.

Formative Assessment

Formative assessment is ongoing in our unit of work, as each student's progress is monitored both online and offline. Feedback is provided both during and after students' quests have been submitted on 3D GameLab. Student-student and student-teacher dialogue within forums are also part of formative assessment because they demonstrate what students are learning, as well as helping students improve their work.



When students receive formative feedback after submitting their quests on 3D GameLab, they have the opportunity to make adjustments. In essence, the students work to continuously improve their work throughout the unit. Ongoing formative assessment reflects students' growth throughout the process, rather than measuring whether they have reached a standard at a particular point in time. Gee and Shaffer (2010) stress the importance of focusing on growth with respect to assessment.

Summative Assessment

The summative assessment in our unit is an extension of the ongoing narrative and inquiry process, and is designed to encapsulate all student learning in the unit. It made most sense to design an open-ended, collaborative task to close the unit that could be assessed both individually and collaboratively.

QUEST DETAILS

sps

Your final quest 0 -- mins No Retri. Education No end date

Just as you are finally getting into your new community and feeling like you have gained the necessary skills and knowledge to live amongst the Australian residents, the society faces another challenge: global warming.

With this climate challenge, a number of coastal communities are experiencing strange weather conditions including flooding and fires. Recently a warning was given to your new community about the very high possibility of a fire in the coming days.

FIRE DANGER RATING TODAY

PREPARE ACT SURVIVE

CODE RED

The community is very scared because they feel they lack the knowledge and financial resources to protect their community. It is suggested by one of the leaders that all members of the community will need to be working as soon as possible so that they can better prepare themselves.

Although you have learnt a great deal about your new community in recent months, you are shocked by the fire warning. You have tried so hard to become part of the new community and now it could all be lost. You are scared that the residents' own fear and desperation might lead them to excluding you. This makes you want to show the residents your determination to save the community through your unique contributions of your skills and knowledge.

A plan of action

The community will hold a meeting to discuss a plan of action, where you will work in teams to construct a presentation on the following areas:

- Rebuilding the community
- Managing a fire/fire prevention

Rebuilding the community

When the fire occurs, there will be many issues you will need to consider to rebuild your community.

- Sources of food - what types of food can be grown and what types can be harvested or hunted from animals?
- How can you best use the natural resources from the land?
- Water will be scarce and must be used carefully. You must consider how this affects your resources and the basic needs (e.g. thirst, hygiene) of your community members.
- What will you wear and where you will live - what type of clothing and shelter would someone in your community have and what would it be made from?
- What are some recreational activities that are unique to your community? This helps build your community's identity.
- What are some things from the past that could be adapted for use in the present?

Managing a fire/fire prevention

- How will you control the fire to ensure survivability of the community?
- How does the fire impact your community members?
- Consider the long-term impact the natural disaster will have on the sustainability of natural resources.
- How can you use sustainable practices to help re-establish the community?
- What procedures can be put in place to deal with a natural disaster in the future?

As you will present your plan to your fellow community members, your plan should include a visual representation of what your community will look like after the fire. You can incorporate text, drawings, images, audio and video in your presentation.

Submission Details

Completion of a plan in teams, with self-assessment in the forms of an in-class rubric and reflection.

Summary & Teacher Tips

The Framework

- Use an ARG to frame the unit. Narratives enable you to segment and connect curriculum objectives through the use of scenes and emerging themes. Learning can then be paced by introducing content in gradual arcs or stages.
- The scope of the unit will impact the breadth of the story. A multidisciplinary approach requires a more complex story than a unit that is designed for a specific subject (e.g., literacy). This will require additional time and work. It is easier to design an ARG by starting with a broad story and then narrowing its scope accordingly.
- Use curriculum objectives to guide the creation of the ARG's story. This in turn assists with the design of other fundamental components of the unit, such as instruction, content, communication & collaboration, and assessment.

- **Specific learning experiences can be designed within these stages that gradually scaffold students towards deeper levels of thinking.** We advocate basing this on the inquiry model and/or Bloom's taxonomy. Importantly, students should continue to be challenged.
- **An ARG offers a flexible and engaging way to immerse students in learning.** By starting with a broad narrative, teachers and students have the ability to veer the unit in multiple directions and add/subtract content as necessary.
- **Motivation is a key factor.** Consider the source of student motivation and the impact it will have on student learning. To achieve Meaningful Gamification, it is important to identify sources of internal motivation, such as hints and clues.
- **The unit is for the students!** Give students opportunities to make choices that shape the outcome of the narrative and keep them engaged.
- **Create an authentic learning environment that reflects real-world ideas and issues that are relevant to students' lives.** This allows students to take on different roles and consider various perspectives through character role-playing.

Content

- **Use a LMS such as Moodle, that possesses the ability to host the social media tools and multimedia content you require.** This creates a better user-experience for both teachers and students, as all the desired features are in one place. Additionally, it minimises teacher workload.
- **Use multimedia and social media tools that you are familiar with.** Although it is exciting to explore new technology that will enrich learning, it can be time consuming and exhausting to familiarise and upskill yourself with too much at once.
- **Chunk content in quests so that it is easier for students to read.** One of the benefits of using 3D GameLab is that it only shows content that students require. If you present students with too much information, it becomes difficult to navigate and things can be easily overlooked.
- **Ensure clear and effective presentation of quest content.** Narration is a key form of multimedia that will enrich learning, simply by being available to the students. For example, having text read to students in quests allows them to focus more on the content presented and less on reading comprehension.
- **The teacher plays a key role within the game as a facilitator of learning, particularly as a side character.** For example, the teacher can use clues to scaffold students who are falling behind, and provide new challenges to students who require it.

Communication & Collaboration

- **Provide spaces (i.e., discussion forum) for students to communicate and collaborate with each other.** It is important for teachers to actively monitor these spaces to build on student discussion, and encourage students to share content and ask for help.
- **Design quests as co-dependent tasks to promote communication and collaboration.** This way, students will learn from each other and gain new insights to challenge their current understandings.

Assessment

- **An ARG provides teachers with a rich number of ways to provide formative assessment to students, such as through the LMS, social media tools and in the classroom.** Teachers can keep the game moving by providing formative feedback to students in character and providing them with clues for their next task.

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