# Ready Student One! Exploring how to build a Successful Game-based Higher Education Course in Virtual Reality

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**Abstract:** Today more than ever before, we have access to new technologies which provide unforeseen opportunities for educators to pursue new innovations in online education. Pursuing innovation is a complex process! It starts with an idea, but that needs to be coupled with the right team of experts willing to take big risks and put in the hard work to build something new. An instructional design team was empowered to reimagine an Introduction to Sociology university course as a Game-Based Learning (GBL) experience utilizing cutting edge Virtual Reality (VR) technology. The result was a innovate collaborative process that resulted in a brand-new type of learning based in Game theory, Method of Loci, and VR Immersion Simulations to promote deeper retention of core concepts. The team deconstructed the way that university courses operated, in order to rebuild the educational process in a whole new, learner-centric manner. In addition to a review of the build process, this paper will explore the results of in-course surveys completed by student participants.

**Keywords**: Higher Education, Innovation, Virtual Reality, Game-based Learning, Loci Method

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## Introduction

Information technology has literally changed every aspect of modern life. Higher education is no different. Game-Based Learning (GBL) research has become a key growth area in higher education over the last decade (Vodenicharova, 2022). GBL is an innovative educational paradigm where learners are placed into a theme-based environment where their decisions impact the storyline (Navarro-Espinosa, et al., 2022). The learners are drawn to the relative power of their decision-making which assigns a deeper level of meaning to information studied in the process. Students also navigate mandatory game elements such as incentive systems to motivate them to fully engage in educational tasks they might otherwise find less appealing, boring, or difficult. Instead,

placed in the role of the protagonist, these students are empowered to make choices, take on challenges, and maximize rewards in the form of badges or achievements (Aguiar-Castillo, et al., 2021).

GBL is not the same as Gamification. GBL is a subset of Gamification. GBL involves an entire gamified education course with clearly defined learning outcomes for learners (Vodenicharova, 2022). This is different than Gamification, which refers to a broader concept, used for learning through educational game play (Vodenicharova, 2022). Therefore, if a higher educational institution adds a game element as one aspect to an academic course that is considered Gamification. If the same higher education institution builds an entire course as an immersive story where all elements are gamified to help the student achieve learning outcomes that is a specific type of Gamification called Game-Based Learning (GBL).

In the past, the positive impact of GBL in higher education has been undervalued (Navarro-Espinosa, et al., 2022). Part of this devaluation comes from a resistance to new modalities of pedagogy by institutions and instructors who are comfortable in their current traditional form of teaching (Navarro-Espinosa, et al., 2022). While some resistance to new innovations is understandable and expected there are advancements in technology over the last ten years specifically which has made the use of gaming in higher education courses more potentially powerful than ever (Djeki, et al., 2020). One of these is the development of Virtual Reality systems.

The GBL approach is rooted in the concept that to facilitate a deeper understanding of course material, students need to be engaged in what they are learning and how to apply it (Vodenicharova, 2022). It is not enough, to present the student with a reading and assess their understanding through testing or papers. GBL presents an opportunity to immerse the student in the educational experience, promoting a deeper level of learning than ever before. Indicators of the impact of GBL on higher education across multiple research studies note improvement in three key areas. These include acquisition and application of course content; motivation and interest in course tasks; and confidence and satisfaction in course completion (Vodenicharova, 2022).

This paper will review the literature on GBL, as a subset of Gamification, as well as examine the use of VR simulations in higher education courses. The purpose of the literature review will be to identify potential gaps in the literature where further research would be useful. Following, the literature review, the paper will explore how the instructional design team at Indiana Wesleyan University used current research to guide its current Introduction to the Sociology course build. Finally, a proposal for future research will be offered.

## Literature Review

A recent study at the University of National and World Economy into utilizing GBL in higher education business courses to improve student motivation, activity, confidence, creativity, and teamwork yielded interesting results (Vodenicharova, 2022). This study followed the impact of a higher education course in which used GBL elements including simulation games, interactive presentations, and interactive tests (Vodenicharova,

2022). The study's conclusions found that students self-reported an increase in motivation and learning in GBL courses (Vodenicharova, 2022). Students reported that the GBL system enhanced their knowledge acquisition and helped their decision-making process (Vodenicharova, 2022).

Another recent study which occurred at this time at the University of Extremadura in Spain compared students in a control group of traditional online education utilizing workshops, rubrics, and assignment to an experimental group in a GBL design of the same course utilizing badges, achievements, and leaderboards (Murillo-Zamorano, 2021). This study found that GBL favored an active learning environment where students performed better academically and felt a higher level of confidence in their skills (Murillo-Zamorano, 2021). This study went on to report that in this new modern digital society, students must be given the best opportunity to develop into flexible, confident professionals in their chosen field to compete in the job market (Murillo-Zamorano, 2021). The study challenged the whole academia to consider how it become the needed simulation field where the students as future professionals can learn to take ownership for their own education and carry that forward into their careers (Murillo-Zamorano, 2021).

Academic performance in higher education courses is generally considered to be impacted by cognitive factors and affective-motivational factors (Aguiar-Castillo, et al., 2021). Motivation is generally a difficult process for institutions to encourage (Aguiar-Castillo, et al., 2021). A research study into using GBL with higher education architecture courses showed that student motivation is directly related to learning satisfaction and academic accomplishment (Fernandez-Antolin, 2020).  This study found that GBL motivated students to learn and retain course content better than traditional teaching methods (Fernandez-Antolin, 2020).

Motivation comes in two forms, intrinsic and extrinsic. Extrinsic motivation takes the form of being inspired to complete a task to earn a reward or avoid a punishment (Ryan & Deci, 2000). This may include earning a grade or completing a course seen as merely a step towards earning a degree. Learning becomes a necessary evil to push through to earn the degree for the career that one wants. Conversely Intrinsic motivation is when student's feel inspired to finish a task because it is found to be personally rewarding (Ryan & Deci, 2000). Research has concluded that intrinsically motivated learners demonstrate greater academic successes than learners who are extrinsically motivated. Intrinsically motivated learners have been found to be more dedicated to put in more effort into educational tasks, process more complex course material, and use more effective retention strategies (Reeve, 2002).

GBL in higher education strives to create a story in which the course learning makes sense and is meaningful for the student, thereby increasing their intrinsic motivation (Aguiar-Castillo, et al., 2021). Deeper learning accompanies intrinsic student motivation (Deci and Ryan, 2000). Keller's learning model known as the ARCS motivation model is a teaching approach that is proven to increase and maintain motivational learning in students (Fernandez-Antolin, 2020).   It identifies four essential motivating factors for learning which include attention, relevance, confidence, and satisfaction (Fernandez-Antolin, 2020).  GBL has been identified by research studies as a strong avenue to promote these four motivating factors (Fernandez-Antolin, 2020).

One way the GBL is seen as an innovative and important new higher educational tool is because it challenges learners to be more autonomous and responsible for their learning process (Aguiar-Castillo, et al., 2021). Recent generalized research into higher education indicated that GBL promotes an active learning environment where the students are encouraged to be independent and take ownership of their own scholarship (Murillo-Zamorano, 2021). The instructor is not then seen as the purveyor of course knowledge or the authority over the student's efforts, but rather as a guide or facilitator of the student's own journey to discover the knowledge, develop the skills, and apply the learning (Murillo-Zamorano, 2021). The result is a deeper internalization of the course content and a sense of personal accomplishment in the learners (Murillo-Zamorano, 2021).

One focus of a GBL course is to remove the stigma from not doing well or making a mistake on an educational task and replace this with an environment that encourages students to take risks and try their best (Aguiar-Castillo, et al., 2021). A large-scale study of GBL at Idaho State University used GBL to create a martial arts themed higher education statistics course showed that the GBL course design lowers student anxiety levels significantly (Coffland & Huff, 2022). This research study also identified that students perceived the GBL method was the cause of their lowered anxiety and increased success (Coffland & Huff, 2022).

A large-scale research study in the UK on higher education coursework that was identified to have the most significant attrition rate, yielded interesting results. The study found that all students who participated in GBL gained significant benefits (Zhao, et al., 2022). A higher retention rate was found to be a result among the participants in the GBL course (Zhao, et al., 2022). This study also found that GBL courses that utilized personalization enhanced the deep learning experience of the learners (Zhao, et al., 2022). The same study reported that GBL works best for students who are learning course content for the first time rather than review (Zhao, et al., 2022). It may be that GBL courses work better with introductory higher education classes than upper program review courses.

According to a new research study out of Europe, GBL in higher education promotes deep learning in students, as well as a desire to share their experience with friends (Aguiar-Castillo, et al., 2021). Results also show a correlation between student satisfaction in a higher education course experience and their willingness to engage in deep learning strategies (Aguiar-Castillo, et al., 2021). An interesting finding of this study is the connection between the users' satisfaction and the promotion of the academic institution to others (Aguiar-Castillo, et al., 2021). It was noted that students who had a higher degree of satisfaction in a course, were more likely to engage in word-of-mouth promotion of the higher education institution (Aguiar-Castillo, et al., 2021). Another interesting finding arising from recent research showed that GBL designed higher educational coursework is generally well accepted by the student body and results in an enhancement in the academic reputation of the institution (Aguiar-Castillo, et al., 2021).

Current meta-analysis of the use of GBL in higher educational coursework showed it can enhance student enthusiasm and performance substantially (Navarro-Espinosa, et al., 2022). The incorporation of GBL into higher education course appear to show a notable increase of student motivation, course movement, skill

development, and information retention (Buckley & Doyle, 2016). This analysis is based on the research of the perceptions of both the instructors and students in gamified courses (Buckley & Doyle, 2016).

Despite the many studies indicating the positive proponents of GBL, there do exists detractors in the higher educational field who would focus on more traditional, passive course constructions that place the instructor as the master authority of the course content with students following prescribed assignments to earn points towards a grade (Murillo-Zamorano, 2021). These detractors distrust the student having autonomy in the active learning environment of GBL (Murillo-Zamorano, 2021). Instructors may even fear losing their positions due to the proliferation of GBL, but this form of education still needs the competent instructor. The role of the instructor must though shift to come alongside the student as a humble leader and guide through the growth process, rather than someone dictating information.

In summary, current research has shown that GBL increases students' intrinsic motivation, deeper learning, decision-making skills, flexibility, confidence, knowledge retention, autonomy, and satisfaction. Research also illustrates how a secondary effect of GBL's positive impact on course retention rates, the institution's academic reputation, and word-of-mouth promotion of the university. There appears to be two gaps in the existing literature that this study can fulfill. First, an exhaustive search of GBL higher education studies shows a lack of application of GBL to sociology courses. Second, the same search found a lack of literature concerning using VR in GBL course design. These literature gaps combine in the current Introduction of Sociology VR GBL course build at IWU.

**GBL Design Elements**

Research shows that for GBL to have significant impact on student learning, the game elements must be designed with the expected learning results in mind and active promote learner involvement (Guillén-Nieto & Aleson-Carbonell, 2012). It appears to be very important to identify the learning outcomes of the GBL course first and work towards them through each gamified experience.

Several research studies have proven that when learners experience fun during their studies, satisfaction increases significantly (Aguiar-Castillo, et al., 2021). It is important to keep GBL experiences engaging and entertaining. Having a strong story element that the student could lose themselves in also can aid in achieving fun. Conversely, teaching such a course may be considered fun for the instructor as well.

Perceived ease of use also positively impacts student satisfaction of the overall course (Aguiar-Castillo, et al., 2021).  It is important not to overly complicate the GBL course with difficult interactions and instructions. Keeping it simple and using repetition to encourage student mastery over the course mechanics is imperative. A tutorial may be indicated to help with this process.

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Studies have found that GBL factors that enhanced student learning included competence-based learning, achievement rewards, creativity opportunities, and concept challenges (Zhao, et al., 2022). In designing the GBL course, designers need to explore how to incorporate each of these elements into the flow of the class proportionately.

Research identifies that GBL elements that lower student anxiety and improve performance include storyline, achievements, personalization, segmenting, boss battles, and use of multi-media experiences (Coffland & Huff, 2022). All these elements are important to a GBL build, but the instructional team needs to keep an ongoing communication throughout the process to maintain balance and inclusion.

Tasks that seemed specifically impactful in GBL higher education courses include experiential web-based experiences resulting in a deliverable (Aguiar-Castillo, et al., 2021). Research shows these experiences result in higher student motivation and deep learning benefits (Aguiar-Castillo, et al., 2021). Effective GBL in higher educational courses incorporates cutting edge technology into the class and invites the learners to immerse themselves into the experience (Aguiar-Castillo, et al., 2021). The cutting-edge technology for immersion today is Virtual Reality (VR). The inclusion of VR into GBL has not been significant up until now, but advances in VR are making this an active field for growth.

To be most effective, GBL of higher education courses must focus on learners working towards prizes such as leaderboards, achievements, and badges rather than grades (Aguiar-Castillo, et al., 2021). Many GBL efforts utilize the PBL triad: Points, badges, and leaderboards (Murillo-Zamorano, 2021). As students accomplish the course objectives, studies show that receiving an educational badge increases their motivation (Aguiar-Castillo, et al., 2021). Best practice in this field has these earned prizes in turn impact the student's final grade (Aguiar-Castillo, et al., 2021). These GBL elements invite the student to be engaged in the story of the course and have fun with the process. This lessens anxiety over grades.

Research shows that the inclusion of a process where students complete a profile helps with commitment to the story (Aguiar-Castillo, et al., 2021). This allows students to join into the creation process with the instructional design team and enjoy their course progress on a whole new level. Studies show that feedback about a learner's game task performance in the form of status gains improve the student's sense of belonging in the course scenario (Aguiar-Castillo, et al., 2021). Evaluations by the instructor should be interwoven into the course storyline to encourage learners to feel immersed fully into the storyline. Research shows that replacing traditional instructor grading with an assessment based on a rating system like one to five stars better encapsulates the game theory into the evaluation process (Aguiar-Castillo, et al., 2021).

Another GBL task that promotes learning in higher education courses is having the learner contribute something they have designed or created to a shared online platform (Aguiar-Castillo, et al., 2021). This improves student belonging to the process and competence in the learning area.

*Virtual Reality*

Virtual Reality (VR) technology uses sensory devices to immerse users in 360-degree environments (Liu, 2022). VR achieves attributes of high engagement, interactivity, and creativity (Liu, 2022). This technology immerses the student in a three-dimensional simulation where they are integrated directly into the experience. New studies show using VR in higher education political science courses challenges the students to move from passive acceptance of course content to an active autonomous learning (Liu, 2022).

The use of VR has increased dramatically over the last decade as head-mounted display (HMD) units have become more affordable and available (Hagge, 2021). Researcher's note that educational trends show VR use in education is becoming more prevalent (Hagge, 2021). Modern VR simulations allow students to take part in learning opportunities not achievable in a physical classroom or home setting (Hagge, 2021).

VR allows education to enter the metaverse. The metaverse is currently considered a disconnected VR platform that can be accessed through different levels of immersion including full-immersion using head-mounted displays, semi-immersion using projection screens, and non-immersion using desktop-based VR (Stewart, 2022) Therefore, a course could be built in VR leaving it up to the student to decide which level of immersion they are comfortable with. The more immersive the experience is, the more impactful it will be to the learning that accompanies it.

A recent study at Stanford University on running a VR classroom found the benefits of VR was that it provided the learner with an immersive, interactive, experiential environment (Stewart, 2022). Participants felt that VR made education more accessible, since people could take a university course from anywhere in the world in a constructed environment that reflected the learning outcomes (Stewart, 2022). A student who underwent a 10-week course in VR at Stanford University noted this, "Learning in VR is nothing like what you'd expect. Simply existing within VR cannot be described to one who has never experienced it. The metaverse and all its features force you to think about how we understand the technology and the world around us, and the way we have come to live in a society on autopilot. In a way that can't be described and can only be felt, the metaverse shows you how to disable that autopilot and be actively aware of your presence and existence within a space. It changes your perspective on how much power we have as humans not just within a society, but within ourselves." (Stewart, 2022, p. 14).

A recent study reported that use of VR for educational purposes taps into visuospatial memory states to increase active memory training and promote learned retention (Mathes, 2021). It posits that how a student perceives and moves within a learning environment significantly impacts how they subsequently recall and retain course material (Mathes, 2021).

A research study done in a higher education geography course has shown that while students may have initial fear or anxiety concerning the use of VR in higher education coursework, surveys of the same students after

taking part in VR experiences show an increase in positive perceptions towards the technology (Hagge, 2021). These study results strengthen the case for using VR technology in a GBL course build.

*Method of Loci*

The Method of Loci is a memory retention technique originally posited by Cicero in his *De Oratore*. It is also referred to as the journey method, or the mind palace technique. The Method of Loci involves using visualization of spatial environments to increase deeper learning (Sims, et al., 2022). This memory technique is widely used and taught to enhance retention of learned material. With the utilization of VR technology to provide immersive environments, Method of Loci can be practiced within the confines of the online coursework proving a more intense level of learning hereto unachievable for students. Students in the GBL, VR course are challenged to seek out their learning experience in an interactive city environment called "Curios City". The act of searching through the immersive, three-dimensional, 360 degree learning environment promotes linking key concepts to their lived experience. No longer is a student tasked with imagining the experience of identifying course material and locating it in a mind's eye version of a palace, for no they can place on the VR hardware and freely explore those places pre-designed for just such a purpose.

*IWU GBL VR Build*

The effort of the build at Indiana Wesleyan University was not only to use a meta-analysis of Gamification research studies to identify the most impactful and positive elements of this course design to construct a GBL VR version of Introduction to Sociology. In doing this the instructional design team went through a series of critical analysis of the course build each time leaning more into the GBL concept until a point was reached where traditional education had to be sacrificed for the betterment of the student experience. The following list is what was identified from recent research studies to be core elements of a successful GBL build.

Achievement prizes rather than grades (Aguiar-Castillo, et al., 2021)

Competence-based learning (Zhao, et al., 2022)

Concept challenges instead of traditional assignments (Zhao, et al., 2022)

Creativity opportunities (Zhao, et al., 2022)

Cutting edge immersion technology (Aguiar-Castillo, et al., 2021)

Easy to use (Aguiar-Castillo, et al., 2021)

Educational badges that impact final grade (Aguiar-Castillo, et al., 2021)

Experiential web-based experiences with a deliverable (Aguiar-Castillo, et al., 2021)

Feedback in the form of status gains (Aguiar-Castillo, et al., 2021)

Fun (Aguiar-Castillo, et al., 2021)

Instructor Evaluations interwoven into the storyline (Aguiar-Castillo, et al., 2021)

Interactive presentations (Vodenicharova, 2022)

Interactive tests (Vodenicharova, 2022)

Learner creation contribution to a shared online platform (Aguiar-Castillo, et al., 2021)

Learning Outcome driven (Guillén-Nieto & Aleson-Carbonell, 2012)

Multi-media experiences (Coffland & Huff, 2022)

Opportunity for Personalization (Coffland & Huff, 2022)

Rating system replacing traditional grading (Aguiar-Castillo, et al., 2021)

Remove stigma of failure (Aguiar-Castillo, et al., 2021).

Segmenting (Coffland & Huff, 2022)

Boss battles (Coffland & Huff, 2022)

Simulation games (Vodenicharova, 2022)

Strong storyline (Coffland & Huff, 2022)

With these core GBL elements in mind the Instructional Design Team (IDT) for the Introduction to Sociology (SOC 150) online GBL VR build at IWU first worked on what the Course Learning Outcomes would be. Seven Course Learning Outcomes (CLOs) were developed and scaffolded in the SOC 150 build. These learning outcomes served a guide for the rest of the course build process.  Each experience of the SOC 150 build had one to three CLOs grounding it in educational value. This was designed to meet the core GBL element of being Learning Outcome driven (Guillén-Nieto & Aleson-Carbonell, 2012)

A Course Map was constructed from the initial instructional design meeting to guide the build process. The IDT would meeting weekly to advance the build. In between meetings, dozens of emails were shared back and forth serving brainstorming and critique functions. An introduction to the course was written to be delivered to the prospective student by an AI Chatbot persona that would serve as a job coach and tour guide to the learners throughout the course. We focused on making the story and resulting course flow meet the GBL element of fun and engaging.

After several sessions of the IDT, a story concept was settled on for SOC 150. Since the course was an introductory study of sociology, it was believed that the story should be grounded in the student taking part in building a community of people. That way, the sociological concepts could be learned and then applied to the community. The story evolved into a new community called Curios City that was created by the Curios City Council. The Council then hires a Community Builder (played by the student) to learn sociological concepts and apply them to the community to help it grow into a thriving society. This was designed to meet the core GBL element of strong storyline (Coffland & Huff, 2022).

The traditional Course Menu was replaced by an interactive Community Map divided into 5 Neighborhoods rather than the usual weekly workshops. The Community Builder (student) would navigate the Curios City Community Map to find and engage in VR simulations to learn sociology concepts and then apply them to the Community in an academic deliverable. This was designed the meet the GBL element of using cutting edge technology to provide experiential web-based experiences with a deliverable (Aguiar-Castillo, et al., 2021).

Challenges throughout the community build take many forms including Tutorial, Avatar Creation, Case Study Video Interviews, Experiential Project Report, Social Change Paper, Praying in Color Spiritual Forums, VR Experience with Memo Reviews, and Conversational Essays. This meets the GBL element of interactive presentations, creativity opportunities, Learner creation contributions to a shared online platform, and simulation games (Zhao, et al., 2022).

The Community Builder begins the game by creating an Avatar that can be moved around the Community Map. This meets the core GBL element of opportunity for personalization (Coffland & Huff, 2022). The Community Builder then undergoes a tutorial to acclimate the learner to the game elements and course mechanics. This meets the deign GBL element of making the system easy to understand and use (Aguiar-Castillo, et al., 2021).

In the story, the Curios City Council also hires a renowned master Sociologist (instructor) to monitor the Community Builder's progress and make sure each sociology concept is applied in an effective and healthy manner. This was designed to meet the core GBL element of instructor evaluations interwoven into the storyline (Aguiar-Castillo, et al., 2021). SOC 150 was designed to have four levels of nontraditional academic evaluation to engage the learner. These included Competence Scales, Educational Badges, Title Achievements, and a Community Completion Award to best maximize learning (Fischer, et al., 2016). This met the core GBL element of achievement prizes rather than grades (Aguiar-Castillo, et al., 2021). All 4 levels of evaluation combine for a Final Growth Report instead of a grade.  This met the core GBL element of educational badges that impact the final grade (Aguiar-Castillo, et al., 2021)

There are no linear workshops in the SOC 150. Instead, the Neighborhood areas were designed to each reflect a different part of Curios City that be accessed in whatever order the Community Builder sees fit. This empowers the learner to control the course flow for her/himself and direct her/his own educational experience. This meets the GBL element of segmenting the course (Coffland & Huff, 2022). There are five Neighborhoods in total including Town Square, the Suburbs, Downtown, Uptown, and Campus town. Each Neighborhood was designed to have 3 Points of Interest and 1 Key Person. Each Point of Interest is a different building. Every Point of Interest is a gateway to a Challenge simulation. This meets the core GBL element of concept challenges instead of traditional assignments (Zhao, et al., 2022).

When the Community Builder successfully attempts a Challenge, s/he does this by guiding the Avatar to enter a VR simulation of a relevant Concept Challenge environment. For example, if the learner enters the Library Point of Interest, her/his Avatar appears in the hall before the Circulation desk with shelves of books all around them for the Library. This repeats with any Concept Challenge (i.e., enter City Hall see hallways of Office doors, enter the Park and see walking paths, etc.).  If the learner completed the Library challenge and it is accepted by the Sociologist, the Point of Interest is replaced by an actual Library building Badge on the Community Map.

After the Community Builder completes all Points of Interest in a Neighborhood, then the learner can meet with

the Key Person. This meets the GBL element of Boss battles (Coffland & Huff, 2022). There are 20 Challenges across the entire community build. The Community Builder must review all resources within the environment including readings, 360 videos, and VR simulations. This meets the GBL design element of using multi-media experiences (Coffland & Huff, 2022). After that the learner submits an assigned academic deliverable for the Sociologist to review. If the Challenge is with a Key Person, the Community Builder engages in an interactive conversation with the AI Chatbot about key sociology concepts learned in that Neighborhood that is recorded for the Sociologist to review. This is designed to meet the GBL element of interactive tests (Vodenicharova, 2022).

The Sociologist reviews the Community Builder's submissions using a Competence Scale designed specifically for that Challenge. This is designed to meet the GBL element of Competence-Based Learning (Zhao, et al., 2022).  The Sociologist uses a Competence Scale to determine whether a Challenge is good enough to be "Accepted". If the Challenge is "Accepted", then Community Builder earns the relevant Badge in the form of a building. So, if the learner completes the City Hall Challenge, then s/he earns a City Hall building which appears on the Community Map. This is designed to meet the GBL core element of using a rating system to replace traditional grading (Aguiar-Castillo, et al., 2021)

If the Community Builder's submission is not accepted, then the Community Builder receives a "Try Again" indicator with some Review Notes. The Sociologist will provide the Community Builder with individualized Review Notes that will help her/him be successful when the learner retakes the Challenge. The Community Builder can attempt the Concept Challenge again and resubmit for review by Sociologist until the Community Builder either passes the Concept Challenge or the SOC 150 community build 5-week timeframe ends. It is important to note, that the Community Builder does not have to wait until one Challenge submission is "Accepted" before working a different Challenge. This meets the GBL element of removing the stigma of failing and allows for learners to continue working on a concept until they master it (Aguiar-Castillo, et al., 2021).

The building Badges reflect the Community Builder completing a successful review of the sociology concepts linked to Points of Interest. These Badges include buildings on the map that include the "Welcome to Curios City!" Sign, Library, City Hall, Park, Church, Family Homes, Community Center, Welfare Department, Transportation Department, Café, Courthouse, Hospital, School, Office, and Fairgrounds. Completing a Key Person meeting also awards the Community Builder a Badge in the form of the Mayor, Pastor, Social Worker, Judge, or Dean standing in the neighborhood where they were based.  Each educational Badge earns the Community Builder rewards towards the Final Growth Report.

The Community Builder starts out as a "Novice Community Builder".  Every time the Community Builder completes an entire Neighborhood, s/he earns a Title Achievement which earns credit towards the Final Growth Report calculation. The Title Achievements are earned in this order no matter which Neighborhood the Community Builder finishes first, second, and so on. After the first Neighborhood completion, the Novice

Community Builder becomes a "Developing Community Builder!". After the second Neighborhood completion, the Developing Community Builder becomes an "Outstanding Community Builder!". After the third Neighborhood completion, the Outstanding Community Builder becomes an "Expert Community Builder!". After the fourth Neighborhood completion, the Expert Community Builder becomes a "Master Community Builder!" After the fifth Neighborhood completion, the Master Community Builder becomes a "Legendary Community Builder!" This meets the GBL element of Feedback in the form of status gains (Aguiar-Castillo, et al., 2021).

If the Community Builder completes all Concept Challenges, earns all Educational Badges, and gathers all Title Achievements, s/he receives a Community Completion Award that gives the learner credit towards her/his Final Growth Report. All these factors combine into the Final Growth Report that the Community Builder can monitor at any time throughout the course. In addition, extra credit is built into the course in the guise of completing surveys. These appear on the Community Map as "Bridge to the Future" badges at the north, south, east, and west aspects.

*IWU GBL VR Process*

The instructional design approach to Gamification of SOC 150 at IWU took many stages. The first stage was to develop a shared vision of the class by the IDT. The team needed a multidisciplinary approach with different build members championing different aspects of the build whether it be story immersion, academic integrity, technology interface, or learner experience. This also involved the team member getting to know and understand each other's perspective, strengths, and potential blind spots.

The second stage was for the team to collaborate a storyline that would capture the course learning objectives (CLOs) in a believable way to encourage student buy in. This was a dynamic process that would be returned to several times throughout the rest of the build process. It was important to the instructional design team for the course to have educational integrity overlayed with engaging fun gameplay. All traditional language was systematically removed from the GBL build.

The third stage was to utilize the developed story as a guide to design game experiences that would effectively capture course concepts in an engaging way. Many challenges were designed and reworked. Many were thrown out even after significant work had taken place if they did not fit into the story while being anchored in the CLO. Many traditional aspects of online education were deconstructed in the process. There was nothing considered off limits as conventions like workshops, rubrics, gradebooks, linear flow, and more were removed from the build to make way for new exciting GBL elements based on research.

The fourth stage was to settle on the best technology that would deliver the GBL experience in a truly immersive way. The team agreed early on that the Introduction to Sociology GBL build would work best if done using VR simulations. Research into various VR educational programs and learning management supplements

occurred with the team sharing resources. The instructional design team agreed the Engage platform would work best with this build. Engage is a leading metaverse platform founded in 2014 as an XR studio featuring educational programming (Stewart, 2022). Engage is accessible through VR, desk-top computers, tablets, and mobile devices. The platform utilizes avatars (personalized self-representations), multiple virtual locations, and IFX (3D objects) (Stewart, 2022). Engage also has teleport function to reduce instances of cybersickness (Stewart, 2022). Engage was recently used to run a 10-week Communication course at Stanford University which resulted in two case studies reviewed by the SOC 150 Subject Matter Expert.

The fifth stage was to build the mechanics of the course in a way that brought the four previous levels together in a powerful way for prospective learners. There was a continual process of editing and reworking emanating from frequent instructional team meetings and email conversations.

Indiana Wesleyan University is a Christian university. When looking at any type of class build, it was important to make sure that it is biblically sound. There was an idea early in the build to have the class to mimic the Holy Trinity and how it works within our lives. By doing this, not only are biblically sound principles introduced into the class, but the learner is also exposed to the practicalities of how God works within lives.

In traditional educational systems, the teacher is the master authority over the course and material. Conversely, the student is a passive participant absorbing the information given. Christianity breaks this mode though calling for people to be active participants in their own faith and growth, while Christ comes alongside them. This active learner and partnering teacher dynamic became the basis for the GBL course build. Instead of the instructor being the master authority, giving information to the passive student, the instructor now comes alongside the student and actively working with them to create the thriving community.

In the GBL course, the City Council is equivalent to God having created Curios City for people to live and enjoy. Despite this, issues of prejudice, conflict, and inequality have taken root in Curios City. The City Council is an entity in relationship beyond the scope of the perception of the GBL build that has called upon the Community Builder to join in the creation process. The City Council can be seen though in the reflection of its creation Curios City. It wants good things for the people of Curios City.

The Tour Guide/Job Coach ("JC") is reflective of Jesus Christ. The Community Builder is called to be active participants in the community and JC comes alongside her/him. Even though Jesus is the master of all things, He never comes at people in such a manner. Instead, He walks with us, guides us, directs us, and provides an empathic ear. He allows us to fall and get back up and try again. In fact, He encourages to have peace amid the struggle. In the course, JC guides the Community Builder through the course and teaches her/him what the learner's role is, as well as how to accomplish it. JC never forces his viewpoint on the Community Builder, but rather offers ways to move forward on a good and rewarding path.

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The Holy Spirit is represented by the Sociologist within the GBL build. This is the role that the instructor plays in the GBL course. The Holy Spirit convicts people of what is right or wrong; good or evil; healthy or unhealthy for their walk in this life. The Sociologist, in this role, provides feedback to the Community Builder on the best approach and application of course concepts, but ultimately it is up to the Community Builder what s/he does with that feedback.

The Community Builder (student) can choose to follow or go his or her own way. The Sociologist works with the Community Builder strengthening her/his resolve, cheerleading and challenging the learner.

## Conclusions

Despite detractors, GBL has been shown across multiple research studies to improve student motivation, learning, and retention if its design meets core GBL elements. These elements form a roadmap for academics to create new effective GBL learning opportunities. VR is an evolving technology that when utilized within GBL courses can take the learning opportunities to a whole new level. VR GBL has the potential to revolutionize the higher education system if enough educators and students are willing to pioneer these early courses and share their experiences. Continued research into what works and what doesn't will help develop best practices in VR GBL.

## Future Research

IWU intends to run a research study with the first year of the GBL VR version of Introduction to Sociology. This would best occur using a quasi-experimental design of student experimental group within a GBL VR learning instructional course and a control student group non-GBL VR learning instructional condition. This would allow IWU to compare students in a control group of traditional online education utilizing workshops, rubrics, and assignment to an experimental group in a GBL VR design of the same course utilizing badges, achievements, and rating system.

A recent study into GBL course in higher education programming courses identified three key components of GBL. These entailed 1) usability of the game; 2) impact on knowledge acquisition; and 3) user experience (Zhao, et al., 2022). Another study into using GBL is higher education hospitality programs identified five key components to survey student's perceptions on a gamified course experience being usability, fun, usefulness, reward, and satisfaction (Aguiar-Castillo, et al., 2021). We intend to use these and other studies as a guidepost for our scholarly approach. Based on the above information, the following hypotheses have been put forward:

H1: Perceived usability of the GBL VR will positively affect student perception of the course.
H2: Perceived fun of the GBL VR will positively affect student perception of the course.
H3: Perceived value of the GBL VR will positively affect student perception of the course.

H4: Perceived motivation of the GBL VR will positively affect student perception of the course.

H5: Perceived knowledge acquisition of the GBL VR will positively affect student perception of the course.

H2: Perceived satisfaction of the GBL VR will positively affect student perception of the course.

A survey will be developed to examine each of these core GBL fundamentals and administered in the course to both the control and experimental groups. These survey questions will be charted on a 5-point Likert scale including [1] Strong Disagree, [2] Disagree, [3] Neutral, [4] Agree, and [5] Strongly Agree.

The Survey will follow these 4 key components:

Usability:

"I find it easy to navigate the course elements"

"I have no problems completing my work in the course."

"I think the instructions for the course are easily understood."

Fun:

"I find the course is an engaging approach to Sociology"

"I believe the class elements are fun."

"The course experiences make these concept interesting."

Value:

"I think the course elements are useful to study Sociology."

"I think the information presented about Sociology is valuable to know it deeply."

"I find the course allows me to apply my learning of Sociology."

Motivation:

"I feel motivated by the course feedback to achieve"

"I thought that my achievements in the course were reflected well"

"I felt the use of course elements were helpful in encouraging deep learning."

Knowledge Acquisition:

"I thought the course elements helped me understand course concepts"

"I felt I learned a lot in this course."

"I believe I will retain this information after the course is over."

Satisfaction:

"I found the course to be a positive experience."

"I would recommend the course to others."

"I would choose a course like this again in the future."

All data from the surveys across 1 year of coursework will be evaluated to determine whether the relationships between the variables of the IWU research study adequately reflect the correlations observed in the literature review.

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