HOW DO TEACHERS EVALUATE MINECRAFT LEARNING IN THE CLASSROOM?

"It wasn't a matter of them measuring up to our expectations, they totally exceeded them…"

- Minecraft Teacher

More than a Test

For classroom teachers, the end of the chapter has some ideas for using Minecraft as an evaluation tool. Minecraft teachers also *evaluated* Minecraft activities and the bulk of this chapter puts a spotlight on how they choose to do this. Subject area content is important to these teachers, but is not consistently or predominantly on the minds of Minecraft teachers when they evaluate classroom use of Minecraft. Instead, they gauge a lesson quite differently than we might expect. Across our interviews, Minecraft teachers assessed the value of their new lessons based on: their own learning, student engagement/motivation, social skill building, and problem solving.

At first glance, building a block house seems like it may not be related to core subject areas at all - and might possibly be a complete waste of time. Even when the ideas in the last chapter played out well, some teachers spent large amounts of prep time and class time delivering the content. Is it worth the time? Is it relevant to the curriculum? Some teachers in the study were keenly aware of this balance:

> "I have curriculum to deliver and assessment to do and recording to get done. I can not just let them play. I don't know if that is short sightedness on me or whether that is just a fact."

Teachers have a mandate to teach particular skills, subjects, and tools to their learners - they are not babysitters. As a society, we demand that teachers keep this focus and have an expectation that they actually plan for and evaluate innovative ideas, at least in part, based on their ability to teach curricular content. So, the time/learning ratio question is legitimately posed, not just to Minecraft teachers, but to any new idea for the classroom. Teachers should always be evaluating a new idea by asking, 'Is this activity adding appropriate value for the time spent?'. This chapter starts by asking exactly how Minecraft teachers evaluate new classroom practices.

Where I expected that at least a few of the teachers would brag about increased test scores, few did. Their focus was not necessarily on test prep, rote memorization, or trivia facts. Some teachers even rejected these as distractions to the larger goal of raising children. Most looked at these elements as only a part of what they were designing for in the classroom. Subject area learning came *after* other relevant signs that they were on the lookout for.

In narrative analysis this is significant.

Narratives reveal what the storyteller values and what they think the listener needs to hear. For instance, if you were to tell about a new piece of software you are using, you may show it, then talk about its speed and cost. This kind of 'story' details the artifact, but also allows us to see what you value. Namely, you justify your choice with what you perceive is most important about it or what you think will persuade the listener. In the example, you are revealing that you value software that saves you time and money. Time and money are relevant measures, or evaluators, of the software.

Likewise, when teachers share classroom ideas, they commonly provide introductions and epilogues that they perceive are relevant evaluation points of the idea itself. So, when they share that the lesson resulted in increased test scores, we can reasonably conclude they think test scores are important measures of success. With the national conversation on accountability, scores, remediation, value-added activities, and standards, we expect innovative teachers to qualify their stories with test results. Yet, test results are clearly not what these teachers valued most.

> "In many ways [these] are even more important than the active standards in which we test students on all the time."

Great lessons are about more than a test. Minecraft teachers occasionally explain how students learn content, but more often include what *they* were learning, student engagement, motivation, learned behavioral social skills, and problem solving behavior. These goals appear as they tell about Minecraft, and remain as constant measures of success in their classrooms. "Across cases, Teachercrafters share that a 'good lesson' involves these key outcomes:

- Teacher learning,
- Student motivation and engagement,
- Community building,
- Student problem solving, and
- Curricular learning.

Minecraft provided a context to measure all five of their valued outcomes. None of these should come as a surprise to an experienced educator and they are *common* evaluation elements across narratives in this study. Yet, we may often train teachers to look only for what students have memorized (curricular learning) without necessarily training them to look for and value whether or not *they* learn when they try a new idea, or if their students are learning to work together.

For Minecraft teachers, these values are not secondary to curricular learning, they are equal to, or if anything, supercede curricular learning as outcomes that matter. They focus on the software within a larger classroom experience and how it played into that experience. They go out of their way to clarify the primary importance of non-curricular evaluation of lessons:

> "Our primary goal isn't to fill them with knowledge but to create experiences
> from whence we can draw knowledge"

Commonly, in research, we measure an input with pre and post testing to see what content is learned, yet not one of our teachers narrated this as a validation of their use of Minecraft. It is not clear that these knowledge based measures of learning are irrelevant, but they are at least competing with other goals the teachers had, for instance:

> "I can point to academic standards and say this reaches that standard but there is
> no standard for managing your time or for collaborating with the person sitting
> next to you or for organizing a team and assigning jobs."

These Minecraft teachers want students to do more than memorize. Life and work skills are of greater importance and at the edge of the kind of thinking valued by these teachers. They suggest that students need to exercise imagination, creativity, or ingenuity around sticky problems. So, they are generally looking for evidence of student thinking, engagement and motivation, positive social behaviors, problem solving, and also curricular learning. In short, Minecraft teachers are looking for engagement more than scores, problem solving more than 'correct' answers, and evaluate the use of Minecraft based more on their own professional learning than on any external recommendation.

Learning from Students

Teachers, seeking higher level thinking habits, have to find a balance between work that is too easy and too hard for the largest number of their students. This requires years of observing students when trying new lessons and a refined expertise in reading student reactions. As we saw in Chapter 5, these Minecraft teachers are experts at watching. They sample ideas with students, test them after school, and informally seek feedback from their charges; so classroom implementation is a logical extension of these validation techniques.

When trying out an idea in the classroom, watching student reactions is the final test of a lesson idea - this is central to their ability to pursue promising lesson ideas and reject ones that come up short. Watching students in the classroom is not separate from validating an idea, it is part of the same process. Learning from students is a skill that Minecraft teachers take for granted, and therefore shows up in their stories.

Curiously, it was not always considered a bad thing when students were confused or challenged by instructional designs. Convinced Minecraft was good for her students, one teacher explained:

> "I would say most of the rest of them were overwhelmed by it. Like, 'What are we supposed to do?' 'What is the assignment?' 'Why are we here?' 'What is the goal?' 'Where do I find the treasure?' You know, stuff like that."

Typically, an overwhelmed student is bad. For this teacher it was an observable sign that the students were asking the right questions and that the activity was pushing them to think for themselves. So the 'overwhelmed' students had to start thinking differently, creating, planning, and exercising the part of their brain that had been starved in highly structured learning spaces. In this case, 'overwhelmed' was a sign that the design was effectively frustrating students that needed to increase their ability to think for themselves.

Teachers are trained to design lessons that carefully scale difficulty toward every student successfully learning. For instance, I remember having to turn in daily lessons, as a young teacher, that started with SWBAT (Students will be able to). But in practice, that outcome often is less clear and very diverse student populations can start into new content with confusion and difficulty - or mastery.

'Overwhelmed' is not bad, it is inevitable; how a teacher deals with it, however, marks that teacher quality can be learned. Notice, above, that the teacher says, "You know, stuff like that", as though this is common knowledge. To a practicing teacher, or at least to Minecraft teachers, 'overwhelmed' is simply part and parcel to testing new ideas. Their initial confusion, then, is not as relevant as what students do after starting confused. Does the lesson eventually lead to clarity? Do students help each other out? Are they motivated enough by the goal to

overcome 'overwhelmed'? These are what Minecraft teachers are looking for when they try a lesson.

So, consistently, our teachers explain how they first want to watch students wrestle with Minecraft and figure it out. They were checking their own expectations against student performance. Instead of making things simpler, they first wanted to see what happened in the face of a real challenge:

> "We would have never seen what the kids would do if we had managed it with a curriculum instead of stepping back to watch where the kids would go with it.

This is interesting. This implies that the teacher has some learning to do with every lesson they try out. Teaching with Minecraft, or other digital games, requires teacher-designers to explore the medium for themselves.

Also, after narrating their story, Minecraft teachers show value by comparing problem-based learning to 'managed', or outcome-based, curriculum. What is the difference? Managed curriculum implies unified delivery of common lessons so the average student will master the content knowledge. For non-teachers, this is the bread and butter of all textbook based curricular material or even much of today's digitized curriculum. This may be good for making sure even the average student keeps up, but extremely limiting to quick learners and alienating to slow learners. Differentiation or project-based learning allows all learners to perform at their own level. The goal is that all students advance their skills, thinking, and learning - not a common standard, or 'bar', to jump over.

This is a subtle shift in thinking, but illuminating: Minecraft teachers often challenge, rather than assign; cheer and challenge, rather than provide incentives; and watch students, rather than having students watch them. As teachers they guide, but even the popular 'guide on the side' approach doesn't quite capture the degree to which they favored the term "watch" instead. 'Guide' still implies that the teacher initiates and directs learning, watch implies that teachers wait for students to some degree and then react.

Notice in chapters 6 and 7 that some teachers invested considerable time in preparing Minecraft lessons. 'Watching', in these narratives, looks more like when a filmmaker watches audience reactions to their film. It is active and framed by a set of expectations that the teacher has for the time spent. Teachers that used a more open approach would set the parameters of classroom activity and expect students to 'play' along with those. From there, these teachers were still curious, active observers of what students would do within those parameters. Like laboratory researchers setting up an experiment, these teachers honestly wanted to see what would happen and to what degree students would surprise, impress, come up short, or delight them with their work.

> "It wasn't a matter of them measuring up to our expectations, they totally exceeded them…"

So when expectations are met, the evaluation of the lesson is positive. When they are not, the teacher would presumably go looking for new ideas. Minecraft teachers often explain a degree of surprise at student performance, because having all students follow the same steps, they explain a goal and watch students discover their own path toward it.

> "I've found is that there is always one or two students in my class who if they aren't experts, they are pretty close and they are definitely one or two students in each of my classes who knew more than I did."

Watching, or learning from students, is standard practice among Minecraft teachers, and is consistently narrated as justification for using Minecraft in the classroom. Practically, when they watched, they were able to learn the appropriate level of challenge, allow the activity to set the pace for students, and intercede or redirect when needed. Others also watched for opportunities to teach, assign challenges, new lesson ideas, or just student delight in lesson designs and suit their own curiosity. In the stories, these are conveyed not just in terms of Minecraft use, but as a benefit to their practice in general. Particularly, they look for motivation and engagement.

Motivation and Engagement

Minecraft teachers share that student engagement is one of the ways they saw that Minecraft was working in their classrooms. Engagement is an observable sign of motivation and the two are used interchangeably by our teachers. Where other work provides more precise definitions of these terms, I will reflect the looser general use found in the narratives. Each story is supported with a comment about engagement or motivation. This one is a bit awkward, but it is representative of how the teachers connected engagement to a range of other learning benefits.

> "I think this project was one of the best I've had so far because it was a high level of engagement and we're working with multiple skills… they were training at the same time."

So why is engagement important? Obviously, it is nice if students are motivated, but they can still learn even when it is just… work. Can't they? I have also heard teachers argue that it is not their job to motivate students - students should see the benefit of learning prior to setting foot in the classroom. Shouldn't they? Surely, engagement and motivation are not as valuable a measure as test scores, yet Minecraft teachers used these as internally valid justifications for using Minecraft in the classroom. Why?

"I haven't specifically used the word engagement yet, but that is the first
thing that anyone should mention. It is really powerful when you hear a kid say,
'I used to hate waking up in the morning and coming to school, but [now]
I can't wait to get there.' That's really meaningful."

First, these teachers both value engagement and assume that a motivated student eventually learns more than a non-motivated students. Where this study does not confirm or deny this link, we can see more specifically what about engagement was valuable to Minecraft teachers. Motivated students spend more time on task and universally improve learning across abilities and learning styles.

"They are motivated to become experts on the game. They do their own
research at home. They figure out their own strategies. It really takes on a life
outside the classroom walls. I think that is something that every teacher should
be trying to do."

Second, Minecraft teachers are looking for engagement as a sign they have addressed learning styles. Some of the teachers appreciate that different students learn differently, so any lesson that engages a number of different types of learners catches their attention. This teacher calls them 'player types' in relation to the game.

"I wanted to create activities for each of these player types."

These kinds of activities are rare and usually require resources and time (like field trips), so when a software application challenges *and* engages, this is worth telling me about in an interview:

"The time on task is 90-100%. I've been working with middle school for a year
and a half and what I've noticed is that just doesn't usually happen. They are the
most off track people I know but they are willing to sit at a computer and look
stuff up and when they get frustrated with things they go find resources that
will help them."

Time on task, as a measure of engagement, speaks to efficiency of classroom hours. Practicing teachers know that time is precious and they weigh activities not only on how much curricular learning is happening, but on the degree to which the activity draws learners into the material. Because, especially with younger learners, this can lead to learning outside of class, investment in engagement and motivation can lead to larger payoffs in curricular learning. Traditionally, an 'anticipatory set' has served to quickly pull students out of the hallways and into focus, but these teachers treat entire lessons as engagement tools or as supplements to the larger goals of the class. This opens up understanding evaluation not just as lesson to lesson, but unit to unit, or even course to course.

Third, engagement and motivation is observed when students are acting like professionals. Minecraft teachers want to see that their students have engaged with class content so much so that when they observe the student it looks more like they are playing at a hobby than doing their school work.

> "All my colleagues are saying [the students] aren't working together and they come into the minecraft class and they have prepared in their breaks what they are going to do and they come in and sit and are totally engaged for one and a half hours and when the lesson is over I have to tell them we are finished now you have to log off."

This is evidence, to this teacher, that a student can act differently in different classes based on the experience the teacher provides. I would suggest that the comparison is not the point here, but the notable shift in engagement is at the root of their justification. They evaluate the effectiveness of Minecraft by observing student engagement; and engagement is not bound by classroom minutes. Across stories, Minecraft teachers shared tips on how to arrange classrooms (so you can see all screens from the middle), using tools to 'finish' class (MinecraftEDU has a 'freeze' function for teachers), and students that went home to learn more about a subject because they were engaged in the subject material.

> "He had a student last year who came up to him and said, 'Sir, I have been reading about China,' and we were just about to start the unit on ancient China, 'And I know everything about it.' [The teacher] was like, sure, yeah, whatever, not really believing it but wanting to encourage his enthusiasm. As the unit started and a couple of weeks in, he would be saying something and then the student would raise his hand and say, 'Yeah, and then this is what happened.' He would basically be saying all of the factual information before the teacher could even say it. He actually did know most of the facts and information of the unit. It was all from [Minecraft]..."

The story continues with a clear connection between why engagement and motivation are important, finally, because they actually lead to content area knowledge. Prior to summative assessment of a lesson, effective Minecraft teachers use constant formative assessment of engagement and motivation because:

> "...He really took it upon himself, when he knew that ancient China was coming up, to go explore that area, read every little single info block, take little notes on it, and sure enough he knew all the basic facts and information. Now of course, he didn't understand completely from our in-class activities and our reflection papers and things like that, but so far as pre-existing knowledge, it blows away anything."

Positive Social Outcomes

Closely related to engagement and motivation, Minecraft teachers evaluated effective learning plans based on how students related socially during the implementation of the lesson/s. Students, when engaged can work together out of pure enthusiasm. This is easy when they are friends outside of class, but evidence of effective learning designs when observed between non-friends.

> "So, this little group of kids that wouldn't talk to each other outside of class unless forced are working together and figuring out or delineating their roles in the town."

> "One or two kids figured out the mechanics of farming really quickly so they were the experts and helped others. Some of the kids that were good at building would build little barns for other groups. They would specialize…"

This teacher observed students negotiating 'roles' and was impressed as much by their ability to work across social partitions as their content area learning. This speaks again to their desire to teach the whole student. Part of growing up is to learn to talk and work with those that you may not spend time with socially. This social element of evaluating a lesson is reinforced even outside of the teacher's own practice.

> "I actually had my principal come into my class to sub a couple of weeks ago during this typing class and she has not been able to stop talking about it since she came in for that very reason. She said she saw students who she has never seen open up before were actively involved and engaged and they were getting along and she has just been really interested ever since."

Student behavior was consistently reported as not a problem when using Minecraft. In fact, because most behavior infractions happened within the digital world (griefing, stealing, and/or respect issues) the teachers shared that these were abstracted a bit and made counseling the students easier.

For instance, when one kid started to dig under another student's house, the latter complained. The teacher does not tell the story as a negative aspect of Minecraft, but instead interprets this as an opportunity to talk about respect for 'space' issues that the student had outside of Minecraft. Other problems arose when outside students were allowed into the class server:

> "The most serious thing was when a student invited his cousin who didn't go to our school to play and the cousin started using swear words and all kinds of stuff like that. So, I printed out the chat log that I can get from monitoring the server, gave it to our assistant principal, it was on her desk the next day, talked to the kid who invited him, had him sit down after school."

Otherwise, negative class behaviors were perceived consistently as minimized by student engagement in Minecraft activities, class expectations, and the threat of losing the 'privilege' to work on projects in Minecraft.

> "We're finding students that are doing really well with Minecraft are having fewer discipline issues in other classes."

> "It's almost bad because I'm afraid that when I do get some negative reactions I won't have had practice in how to handle it."

Finally, Minecraft teachers noted when students started to help each other. This is especially important when setting up a project-style lesson. One teacher will have a difficult time answering every question that comes up. However, when some students that are excelling at a project can handle basic questions, the teacher will take notice and appreciate the help. A teacher that tells content might be concerned when a student 'takes over', a teacher that sets expectations is relieved. A variety of class settings allows some students to excel in a Minecraft project, where they may not in other classroom settings. This teacher points this out and shows how they see emergent leadership as relevant in evaluating a lesson.

> "It is good to see that situation where kids who are exasperating to a typical teacher, they aren't in this situation. They end up being the teachers themselves."

Overall, Minecraft teachers consistently looked for social behaviors in students. When using Minecraft they saw positive work habits, helpfulness, and students connecting with other students outside of their normal friendships. They appreciated the chance to work with students on real social issues, but use in-game situations to root the conversation. Finally, Minecraft already has a few million kids ready to be helpful, show others, and take on leadership in classrooms that use Minecraft.

Problem Solving

Problem solving could also be categorized as a form of positive social behavior. However, when looking across the Minecraft stories, teachers treated this as a unique feature. Perhaps because 'problem solving' is treated as both a social skill and as a learning goal in literature and professional conversations today (STEM initiatives, 21st Century Skills, or the Games for Learning community). Minecraft teachers agreed that the purpose of a learning design is to create a setting for problem solving.

> "We are teaching them how to think… We encounter a problem and there are things they have to deal with and sometimes they are looking at YouTube videos and doing how to's and teach each other how to do things…"

If teachers are less focused on presenting information, it follows that they have this kind of focus on teaching learners how to find information, sort it, and apply it to tasks. This is internally valuable:

> "It is great to see them problem solving because I don't think they are getting enough of that."

Minecraft teachers, at times, explained their use of Minecraft, similarly, as a kind of supplement to the kinds of cognitive activity missing elsewhere in the school day. Similarly, these teachers recognized a gap in school curriculum around learning professional editors and teaching youth programming code languages.

Learning complex software to accomplish goals, (even silly ones), is relevant evidence of some students embracing problem solving behavior because of classroom exposure to Minecraft. Minecraft teachers regularly explain that Minecraft is a "gateway drug" for professional software and/or learning to use professional digital tools. So when a student engages with Minecraft, they commonly want to know more about how to make videos, change server settings, program their own features, use graphic software to design new outfits for their character (skinning), build group calendars and web sites, organize events for other games, or look at professional editing software.

Problem solving improves as they play the game, because larger projects require teamwork and communication. This too stands out when they share the results of using Minecraft. Teachers explain that they see growth over time in problem solving skills. Effective problem solving can be larger class conversations (classroom planning meetings) or they can be smaller, efficient, communication that the teacher observes:

> "Students were just organically building and deciding as they went with very little communication; just deciding where things would go and how something would be. That's really fascinating, how much or how little communication they use when they are building together and how organic that is and how they negotiate how that will turn out."

I would suggest that these kinds of informal observations are primary evaluators among the teachers in this study, along with rubric assessment, traditional testing, and student presentations of their work.

On the other hand, in order to represent the range of teaching philosophies in this study, Minecraft does not have to evaluate anything to be valuable. Where some teachers felt an obligation to teach content, other teachers insisted that Minecraft naturally leads to many of the positive outcomes listed above. They argue that overt evaluation, (especially grades and summative assessments), can be intrusive and even reduce the benefits (like high motivation

or intrinsic rewards) that a game like Minecraft already offers its players. They, along with others, advocate for the value of increasing free time, play, and hobby spaces that allow lifetime learning without expectations.

Evaluating a Minecraft Assignment

This chapter wouldn't be quite complete without sharing some of the ways that these teachers used Minecraft as a tool for students to show their work. Many of the teachers did want to see subject area learning too and asked students to show what they had learned. Minecraft projects are commonly shared with the teacher as a picture, by opening up the game and doing a 'tour' of work done in the game, by writing about experiences in Minecraft, by taking a test on the subject matter, or by creating a video using screen capture software. Most teachers had tried more than one of these approaches across iterations and even on the same project. One interesting approach was to use external software to 'pull' Minecraft projects into a virtual reality.

> "An app called Minecraft Reality… you know chunking out the segment of their space and creating it and putting it into an augmented reality thing we can set it on their [desk], view it, and… and the kid can walk around and show their creation."

After the interview I tested this out. Using an iPad as a lens, the software marks a real location as you move the camera lens around it. Then it locates the Minecraft project within that location. On a desk, the floor, or in a gymnasium for a 'fair' like event. Students can show off their Minecraft projects in a variety of ways. All of these presentation methods depend on the project itself representing or demonstrating what the student has learned.

This looks very similar to any project-based learning environment, starting with establishing clear expectations, or criteria, for the project. Some teachers told the students what these expectations were or gave them as a written assignment or rubric. One teacher worked with students to build the criteria for the project.

> "We'll find examples of product that approximates what we would like to do and say, 'What makes this good? What makes this not good and what makes something better? What qualities do you want to see in a good product?' Then those become our project criteria and so when the student is working on a project, they'll look back at the criteria and say have I met those criteria? Does my product fit the criteria for being a good or an excellent product."

This teacher continues to point that this is effective professionally and they are attempting to teach and model self-evaluation. Depending on the project, criteria may include: accuracy, scale, details added, creativity, clarity of an idea, peer evaluations, or content area questions about the project.

Final work usually had students communicating the expectations of the class within their Minecraft work. It is the learner's job to synthesize work and make the connection.

> "What I had them do there was to record themselves giving a tour through their creation and so they narrated a walk through of their environment and highlighted the things they wanted me to notice. [Learners] highlighted where they integrated concepts from social studies. Then I tell them to try to get those down to a five to seven minute video that I could watch and could assess and see their learning outcome."

This particular example includes both Minecraft and video editing software - and requires students to learn the editing software because they want to show the Minecraft work. Essentially, these teachers value 'show and tell' after 'time on task'. Showing can take on a variety of media formats and include photos, videos, written work, new programs, or a combination of these elements; telling requires that students understand and can operationalize their work within the content area; and time on task implies learner focus, engagement, and efficient use of time inside and outside of the classroom.