Effects of Active Listening in a Virtual Classroom

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Abstract

Due to the pandemic, businesses have had to make use of remote protocols, policies and procedures, up to the point of using *virtual offices* and similar software. Likewise, educational institutions have been evolving to capture the "classic" classroom atmosphere through *learning management systems (LMS)* and online meeting rooms. However, they still generally fail to fully reproduce the aforementioned environment since there is a lack of "real" or physical interaction. Specifically, some elements of active listening, the ability for the speaker and listener(s) to properly engage with one another, are diminished. This research explored the effects of active listening in a virtual environment, mainly through its more physical components such as speech, and head or body movements. Through a game-like simulation involving said components, users underwent two *Focus Group Discussions* between students and teachers to assess on whether or not such actions have helped and in what way or how much. The established effects were that it provided something **good, more, new, fun, comfortable, and else** to the **interactions between students and teachers, their classmates, and the environment**. This was accomplished through the virtualizing the physical elements of the said interactions in the form of **emotional (behavioral)**, **static (idle)**, and **dynamic (moving)** features in the virtual classroom.

ACM Reference Format:
Daniel S. Montecastro, Ligaya Leah Figueroa, Ma. Rowena C. Solamo, and Rommel P. Feria. 2022. Effects of Active Listening in a Virtual Classroom. In *Proceedings of ACM Conference (Conference'17).* ACM, New York, NY, USA, 11 pages. https://doi.org/10.1145/nnnnnnn.nnnnnnn

Conference'17, July 2017, Washington, DC, USA

ACM ISBN 978-x-xxxx-xxxx-x/YY/MM…$15.00
https://doi.org/10.1145/nnnnnnn.nnnnnnn

1 Introduction

The pandemic that started late 2019 brought with it a wave of change and adaptation to the world as a whole. After some struggle, many businesses that could afford to shift to remote operations did exactly that. This ranged from clerical work, court proceedings, financial processes, and even food-based services. However, other sectors were not able to effectively transition online, those built upon *face-to-face* interactions.

Educational institutions are one of those struggling to adjust to the *cyberscape*. From certain perspectives, schools and universities are going on as is, even considering changes to administration, payments, and other services. Yet the most important aspect, the classroom, was hit the hardest.

It can easily be said that most students and teachers are more familiar with the *traditional* classroom setting- whiteboard, the desk, the seats, and so on. Remote learning, however, has to rely on online meetings rooms and *learning management systems*, and there are limits to how much these software can emulate the *feel* of school. One of those lost, critical elements is the physical side of *Active Listening*.

Active listening can generally be described as a means to increase understanding between speakers by means of verbal and non-verbal cues (United States Institute of Peace, n.d.). After all, there is more to conversation and communication than just words. And again, although remote learning tools have created ways to mitigate these losses, the more popular or mainstream applications do not or insufficiently address the loss of the physical side of active learning. As such, this project aims to create a game-like simulation to gauge the effects of active learning in a virtual classroom in order to instill a better appreciation for motion, gesture, posture, and the like in the realm of online learning.

2 Review of Related Literature

This section consists of the review of related literature regarding the primary topic, *Active Listening (AL)*. The first chapter talks about the relationship between AL and *Emotional Intelligence (EI)*, followed by the history and present state of the *Virtual Classrooms (VC)*, and finally coming back to a combination of all factors to speak about the overall effects of Active Listening in a Virtual Classroom.

2.1 On Emotional Intelligence and Active Listening

It is a generally accepted truth that there is more to education than raising one's *intelligence quotient* or *IQ*. Nowadays, proper attention is given to cultivating *emotional intelligence* or *EI*, based on skills such as being able to understand and express one's own feelings as well as properly listen to and feel for others (Ioannidou and Konstantikaki, 2008). This may be due to recent findings that often show positive trends regarding EI and academic performance. One such study done by Viguer et al. (2020) analyzed the impact of an *Emotional Intelligence Intervention Program* on elementary students, revealing that long-term intervention lead to an increased proficiency in certain subjects, overall academic improvement, and a smoother time transitioning to adolescence.

Still, there is much research to be done about the subject, especially in confirming the cause and effect of such matters. In spite of that, a significant number of studies have nevertheless shown that, in one way or another, EI leads to an improvement in the academic spectrum as well as growth of students. In some cases, this results from the development of certain competencies or attitudes, for instance being compassionate towards peers and engaged or committed to one's studies (Estrada et al., 2021). Likewise, it could also be the borne from having instilled the necessary. behaviors. In the case of Astatke (2019), this includes being able to take action whenever needed such as admitting to loss and seeking for help. As Brown et al. (2020) discusses in his paper, AL positively correlates with empathy, a known factor in EI. This study will attempt to do something similar, using AL as the basis for successful emotional development.

AL is commonly understood as a skill than allows for mutual understanding between communicators, both the speaker and the receiver (United States Institute of Peace, n.d.). Specific elements to consider include body language, vocal pitch, communication expressiveness, and vocabulary (Behlau et al., 2021). In regards to body language in particular, there is more to AL than individual skills such as maintaining eye contact and "open" posture, for it is meant to foster depth and meaning to interactions (Brown et al., 2020).

Khanna (2020) described it as being an active, two-way transaction that requires empathy, attention, and constant practice plus effort. Talks involving proper AL mainly demonstrate interest among listeners, encouragement towards the speaker, and the use of feedback and questions. According to them, AL has received insufficient attention, even though it allows for success in building trust, establishing a rapport, demonstrating concern for others- highly beneficial real-life and interpersonal skills. However, the importance of AL is beginning to shine through especially in professions that require much interpersonal communication such as in the healthcare industry.

These more recent studies primarily link AL with EI when considering academic benefits. Kuk et al. (2021) included AL as one the necessary skill in their workshop on "Communication in light of experienced feelings and emotions", whose results indicated significant benefits to EI wrought from development in the students' interpersonal communication, as well as feelings of forgiveness and love. The use of workshops as a long term means of nurturing those skills lend more credence to the normalization of AL in the classroom. Ford (2021) likewise determined that AL and similar factors like empathy, self-awareness, and a "strong lexicon for feelings" are the most important requirements for teaching EI.

Along with that, other studies related to AL have even identified techniques and other relevant information on how to advance the skill. O'Brien and Iannone (2018) argue that AL in the classroom is crucial. It is an effort of equal measures between both the student(s) and teacher(s), adding more ideas, dialogue, feedback, and questions into their interactions. Students have better learning efficiency and retention when enjoying and willing to, as is the case in AL where there is much more focus on understanding and reflecting on the speaker's words (Canpolat et al., 2015). Lastly, Ioannidou and Konstantikaki (2008) recommend that teachers listen to and understand the students' views in order to help them develop AL themselves. With many positive findings between EI, AL, and the classroom setting, it is expected that the addition of the latter's physical components will serve to improve online interaction between teachers and students.

2.2 The VC, Before and During the Pandemic

Even before the shift to remote operations due to the COVID-19 outbreak, online learning has already been integrated into many schools and universities with sufficient IT technologies. Granted, most of these cases use *hybrid* or *blended* learning, using a mixture of traditional and virtual elements to enhance the classroom experience. The more popular applications used include LMSs, online conferences, social networking apps, and other software with similar uses, all having somewhat more limited "human" aspects of interaction with and among students.

A fair number of studies reveal that effective communication remains an essential factor to creating a conducive learning environment, both among the staff and their peers. Johnston et al. (2005) emphasized that the instructor's presence in the course is actually one of the primary contributors to student satisfaction, contrary to common assumptions around online learning. Their study also identified suggestions when designing an online course. Specifically, they suggested that a student-centered design with flexible deadlines, sufficient financial assistance, and a thorough orientation to the course are important facets to keep in mind for the teachers and course or curriculum designers. Additionally, they stressed that prompt, regular contact with instructors and increased interaction with other students are equally major components.

Swan et al. (2000) also found related results. In their paper, they recognized that a consistent course design paired with actual communication elements such as reassurance from the instructors and active discussions within the classroom are vital to a VC. This applies to both synchronous and asynchronous sessions. In a related study, Gedera (2014) observed the way students reacted to their online learning tool, the *Adobe Virtual Classroom*, throughout a semester. Although they appreciated the real-time and audio-visual elements that come with virtual tools, being able to give feedback and words of encouragement to their peers are just as closely valued. Still, technology also comes with its own set of problems, mainly scheduling and technical difficulties.

Other studies focused their works on providing measures to enhance the VC. First of all, Posey et al. (2010) stated that teachers must be required to properly learn remote teaching techniques and how to handle the associated software and tools, especially since they will also be the ones to instruct the students on how to do so as well. While not exactly a social issue, having a proper orientation would lead to less dissatisfaction and feelings of negligence down the line. Meanwhile, online community-building strategies include reaching out early and often, increasing interaction over lengthy lectures, using online features to encourage more discussion, and sharing personal and professional updates during class hours (Berry, 2019). All in all, meaningful interactions between students and teacher go a long way.

At the time of writing, COVID-19 has forced online learning to go from blended to almost if not wholly remote mediums. This has proven to be a difficult process for others. Research done by Bojović et al. (2020) focused on how educational institutions perform rapid transitions toward distance learning. They noticed that a majority of students were able to successfully adapt to remote operations, although a few lacked the necessary resources altogether. In contrast, teachers have had more difficulty in adjusting to certain online systems, like in adapting to solely using LMSs and related IT infrastructures. This issue is even more severe in cases with limited IT infrastructures, inability to secure stable connections, or a lack of the necessary equipment and technologies, which is one of the biggest issues in developing countries.

Djajadikerta et al. (2021) ran a study based on testimony taken from 6 unique universities coming from 3 different countries, 2 of which, Malaysia and Indonesia, are also from the *South East Asian (SEA)* region. They noted that suddenness of having to adapt to completely remote operations in the wake of the pandemic have left both educational staff and students at a loss. Some negative effects that came to light were increased stress due to teachers struggling to adapt online and students being in a new, unfamiliar environment. The 3 major issues identified were technological problems, transitioning to a remote setup, and changes to learning material and means of assessment. However, the students in the study seemed to have mostly "welcomed" the shift to remote learning, and teachers who were familiar with *blended* learning methods, which combine *face-to-face (F2F)* and remote elements, have assimilated more smoothly as well.

In spite of that, Sintema (2020) concluded that behind the issues borne from coronavirus lie opportunities to take and innovations to be made, most especially for the lower branches of education. A study by Chan et al. (2021), for example, assessed the viability of virtual chemical laboratories as alternatives to hands-on lab activities, especially during certain circumstances, namely the inability to be physically present, lack of school facilities, or the current pandemic. Contrary to a few other papers, they have confirmed that, in some cases, the virtual simulations are on par or even exceed its passive or hands-on forms in regards to benefits. There were other studies that explored alternative means of education that made better or full use of virtual tools and methods, namely *virtual field trips*, e-portfolios, e-pals, and other similar media (Cheng and Tsai, 2019).

From a different point of view, Joshi and Bodkha (2021) observed that students preferred traditional lectures, that the implemented *online lecture series* are better served as alternatives or supplements, not replacements, especially during cases such as quarantines. The presence of a teacher increases their attentiveness, connectivity, and understanding by means of further elaborations and responses to physical gestures, as well as increased interaction that serve to break the class monotony. Furthermore, the restrictions found in a physical classroom such as limited time and space to work with instill a sense of discipline and motivation in them. As mentioned before, even early iterations before COVID-19 showed that there are some missing aspects in a VC.

Yet again, attention must be given to the *human* aspect of distance learning. Cygan and Bejster (2021) surveyed the sentiment of public health nursing students regarding their transition to remote learning due to the pandemic. Half of their major findings were relevant to "transition facilitators", which embodied the "caring" nature associated with the field that are stated to "decrease anxiety, promote academic success, and increase student retention." They emphasized the importance of emotional support, instructor availability and communication, and course flexibility and organization as related factors. Similarly, Panepucci et al. (2021) found that additional means of encouraging increased engagement, such as "stopping points" for further discussion or debriefing and elements of humor have lead to favorable student impressions and more engagement to VCs. This improves the amount of interaction, especially in the context of the papers regarding online nursing courses and the pandemic.

The Philippines in particular has a long way to go to improve its remote learning operations. "The country has been one of those hardest hit by the pandemic, evidently so by being one of the last two countries to be stuck with remote learning procedures," summarized Simon (2022), utilizing her insight as a Filipino teacher of a private, tertiary educational

institution. From her own perspective plus similar views from related papers, remote learning should improve its ability to take its students into consideration. She explicitly stated four means of doing so, specifically by increasing engagement through use of the cameras, keeping in mind the more socially awkward students, supporting autonomy while showing communicating value and concern towards them, and lightening their workload while noting their sleep patterns and other courses' requirements.

2.3 Active Listening in the Virtual Classroom

Even as early back as the 2000s, studies have observed the loss of physical cues in virtual environments. Swan et al. (2000) noted the importance of explicit reassurance from the teachers due to the lack of the non-verbal indicators common in F2F interactions. The physical presence of teachers and fellow students in F2F situations seem to add some form of depth or intimacy compared to simply meeting online. Gedera (2014), for instance, noted that students found synchronous classes to have more "human interactions" due to the being able to see physical cues. Furthermore, interactions requiring physical contact are completely absent in distance learning, with a diminished sense of the "human" presence.

There are also common misconceptions when dealing with this subject. Blaine (2019) found that there are certain differences between students and teachers' assumptions regarding remote learning. Their research debunked certain "myths" such as all students being automatically adept with related technology or most students preferring to be left to their own devices. This is another example wherein proper discussion and communication between teachers and students would increase satisfaction for both parties.

But as with everything, there are two side to AL in remote learning. Posey et al. (2010) have stated that there is some trouble regarding adapting some of the traditional approaches online along with the obvious lack of F2F interactions and means of forming strong bonds with peers. However, there are some pros as well. For starters, it encourages a more "orderly" atmosphere than in most traditional classroom environments, emphasizing more thought into the speech content and etiquette. Communication is also improved in some other ways, such as by an easier means of staying in contact with other students, friend groups, and instructors, even outside of standard class hours. The advantages are usually flexibility, convenience or accessibility, and compatibility based on the individual's preferred learning style. Common disadvantages stem from the loss of the F2F aspects of the traditional classroom (Johnston et al., 2005).

Asim et al. (2020) stated that, like traditional classrooms, VCs should still promote AL and the growth of interpersonal skills and should "include dedicated spaces for reflection, exploration, and critical-thinking." After all, the platform of learning has changed, but the goals and objectives have not. Along with maximizing the use of virtual tools to enhance the learning experience, reproducing the lost beneficial aspects of the traditional classroom are also a priority.

A study conducted by Cheng and Tsai (2019) on elementary students revealed that the use of *virtual reality* or *VR* equipment contributed to a increased sense of spatial presence, which generated more engagement in their virtual field trip. The influence on the learning process is thought to be due to a change in psychological state wrought from certain aspects of VR. The characteristics explicitly mentioned in the paper are the freedom of navigation and use of a first-person *point-of-view* (*PoV*), as well as elements of realism and interactivity in the virtual environment. While there were some inconsistencies between their expectations and findings, some measures were suggested in order to alleviate the identified concerns. That aside, merely replicating head and body movement seemed to have allowed the participants to better appreciate the provided virtual environment.

Posey et al. (2010) stated, "Engaged learners are ones who are responsible for their learning, and because they are responsible they are energized by learning." Additionally, the teachers agreed with their sentiment- promoting the use of technology in learning can lead to more engagement in the students' studies. Likewise, Bojović et al. (2020) suggested implementing game-related and social networking elements into courses to increase interactivity, enjoyment, and usage among the users, primarily the students yet also including the teachers. Integrating features that can increase engagement such as game-like elements and more AL-based factors seem to lead to a better learning experience overall.

Saleh et al. (2021) produced results that otherwise state a minimal difference in terms of cognitive performance between traditional and virtual classrooms, based on information gathered from quantitative, physiological testing. Still, their conclusions centered more on the environment, participants, and types of test used. They suggest further research on related subjects such include using different types of virtual tests or activities, focusing on the *digital body* or virtual environment, and other similar avenues of inquiry.

2.4 Research Objectives

Virtual Classrooms are unique in that they can potentially fulfill much more than a traditional classroom, theoretically at much less cost. Using such can allow for differentiation in instruction methods, catered to the needs of the individual student through the use virtual field trips, e-Portfolios, social media, and the like (Asim et al., 2020). Other technologies are also available, such as 2D, 3D, or even VR environments, each with their own pros and cons (Chan et al., 2021).

This paper aims to gauge the effects of Active Listening inside a Virtual Classroom using a virtual avatar in a simulated classroom environment as motivated in the study of Saleh et al. (2021).

Specifically, the objectives are as follows:

1. Find the effect(s) of AL in a virtual setting
2. Assess how the VC acts as a learning environment
3. Check which virtual elements replicate physical AL

3 The Steam Classroom

The software was developed using the *Godot Game Engine*, along with *Steamworks API* through the *Godot Steam* add-on. Using said *API*, the application communicates with both *Steamworks* and the *Steam Client* itself, and in doing so is able to make use of the *Steam Services*, mainly the *Steam Lobbies (& Matchmaking)* functions.

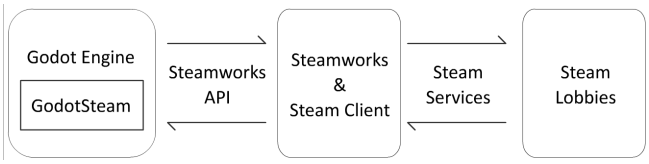


Figure 1. Diagram of Software Architecture

3.1 Scopes and Limitations

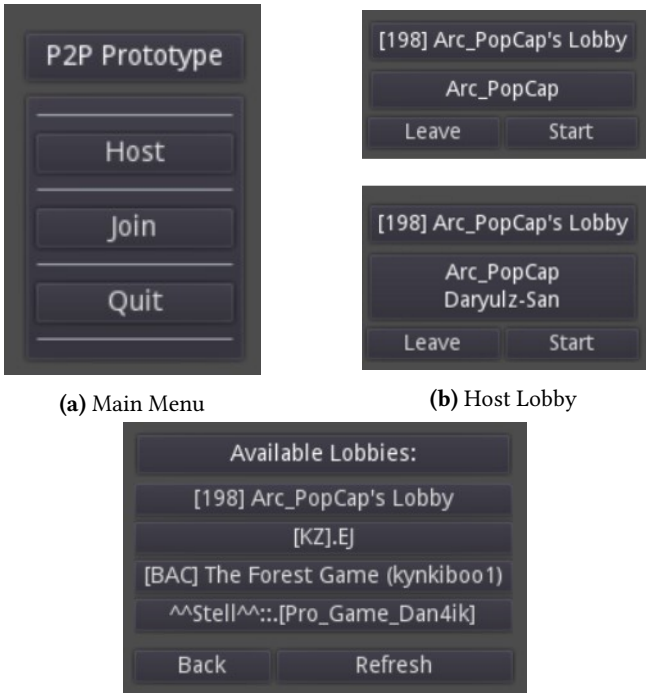
As this is the first version or prototype, only the most basic features and controls were implemented, mostly involving the physical aspects or visual cues of AL. Some of the elements found in the traditional or virtual classroom, like the blackboard or text chat, were not added.

3.2 Minimum Requirements

The application needs a stable internet connection to start and maintain operations. According to the information on *Steam*, the minimum specs requires any *Linux* operating system or either *Windows 7* or *macOS 10.12*, along with support for at least *OpenGL 2.1*. Aside from those, there are no strict checks necessary as this prototype version uses minimal network and hardware processing.

3.3 Hosting and Joining Lobbies

It starts off with an interface for the *Steam Lobbies* with buttons for *hosting* and *joining* lobbies (or "classes"), as well as exiting the application itself. After creating the lobby, the *host* moves to the *waiting room* where all users within can see each other. Players can *join* through choosing lobbies from the *Lobby List*. The *host* can wait for up to 3 other players **(4 total)** before starting the classroom proper, or do so alone.



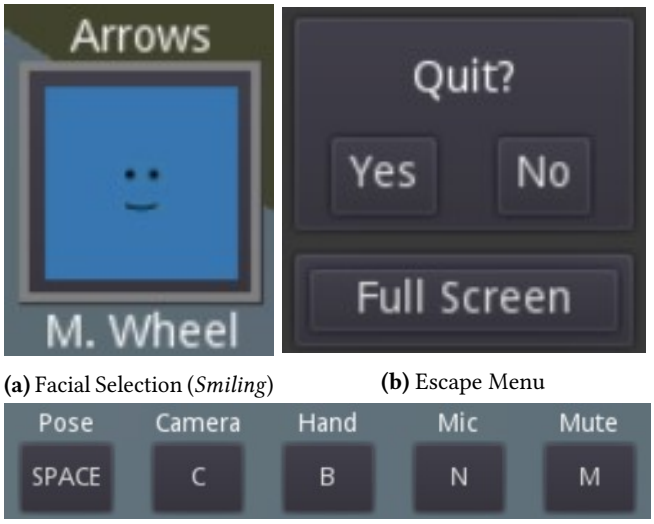
(a) Main Menu **(b)** Host Lobby

(c) Lobby List

Figure 2. Lobby Interfaces

3.4 Player Controls

Each player controls a virtual avatar in said classroom, having the ability to **move the head (or camera)**, cycle though **facial expressions**, change *idle* postures or **raise the hand**, and perform limited voice chat. There is also an *Escape Menu* in the classroom for returning to the lobby interface or switching between windowed and full-screens.



(a) Facial Selection (*Smiling*) **(b)** Escape Menu

(c) Basic Hotkeys and Actions

Figure 3. Control Hotkeys and the Escape Menu

Figure 4. Game Environment and Basic Controls

4 Research Methodology

This paper utilizes a qualitative means of study to gauge the effects of AL in a recreated, virtual classroom. Specifically, data was collected through *focus group discussion (FGDs)*. To analyse data, *thematic analysis* is used to ascertain the themes and concepts that arose from the participants' FGDs.

4.1 Participants

The participants for this study all came from the *Lyceum of the Philippines University - Laguna*. To be precise, student-teacher pairs were gathered from three of their departments: *College* plus their *Junior* and *Senior High Schools*. Since their demographic information would not be relevant to this study, only their ages and their chosen fields of interest were left in the transcript. The 6 participants, 3 students and 3 teachers, volunteered for the study through monetary compensation. The proper channels were also used for contacting and gaining permission from the school itself. All sessions were agreed upon in advance in compliance with the participants.

4.2 Procedures

4.2.1 Exploration of Steam Classroom. , The application usage by participants were mainly done for exploratory purposes, and as such was not recorded. Three (3) sessions were done separately for each of the departments' student-teacher pairs, using *Zoom* to communicate outside of the application. These were held for around 30 to 60 minutes inside the *Steam Classroom*, during which the researcher assumed the position of **"Teacher"** in the classroom with the student-teacher pair acting as **"Students"**. The researcher then briefed them on the topic of AL while allowing them free reign to use the avatar controls and interact with the environment and other avatars during the discussion. This was followed by a similar process but with them the handling position of *speakers*, wherein they were free to form and give their preliminary opinions, insights, and feedback on both the app and the topic of AL. They were again encouraged to try and use the controls throughout this second talk. After the session, they were given a document containing the details about the following FGD, such as the research objectives and guide questions, and then paid the agreed ₱500.00.

4.2.2 Focus Group Discussion. Unstructured and open-ended questions were used in the **two FGDs**, one for the students and the other for the teachers, both done through Zoom a few weeks after the initial testing. *FGDs* were used over *one-to-one* interviews since it was decided that more information can be gleaned from the former than the latter through combining ideas, feedback, and opinions from multiple, similar positions or standpoints compared to individual exploration. Here, the participants were divided into students and teachers. The participants' also consented to having recorded the session.The interviews were held for around 45 minutes to an hour or so, and were separated into the following topics and guide questions:

1. **Physical Aspects of Active Listening**:
   Does the presence of simulated physical motions help in the virtual interaction? Why/not?

2. **Active Listening and Learning in the (Virtual) Classroom**:
   In what way does/n't the virtual environment act as a possibly conducive learning environment?

3. **Regarding the Technology Used along with Possible Improvements**:
   In what way can this be improved using other features or technologies?

5 Results and Analysis

It can be easily said that *live* classrooms have certain elements that are difficult or impossible to reproduce. Much of these are *human* aspects found in F2F environments; the screen serves as a divide between and among teachers and students. Most notably, distance learning prioritizes the oral and verbal aspects, leading to less attention provided to other, equally important factors in successful communication, resulting in more one-sided methods like announcements.

This study aims to highlight the loss of the benefits of these non-verbal elements in remote learning, similar to the study done by Brown et al. (2020). However, a **thematic analysis** will be used to perform a *content analysis* of the recorded FGDs and resulting transcripts and codes. The initial themes were identified over the course of transcription, and refined during the coding process. The coding scheme is based on the 3 guide questions in the FGD portion, further divided into more specific topics based on common answers, words, and phrases stated by the participants, using an *inductive* and *semantic* approach.

5.1 The Effects of AL in a VC

Theme: The Effects of Active Listening in the Virtual Classroom		
Sub-themes & Keywords		**Sample Excerpts**
Something **Fun**: *fun, exciting, entertainment, enjoyment, attention, interest, motivation*	[CLG-S]	It can be **somehow exciting**... on an online setup [of] learning
	[SHS-S]	**more exciting** since this is a new thing... or a new perspective
	[JHS-S]	**draw more attention** since it's new to them
	[SHS-S]	students will be **excited**... it will be **a lot more exciting** than the usual ones
	[CLG-S]	the avatar is quite **more enjoyable**... It **is quite exciting** if they create avatars
	[JHS-T]	It is something that the students who would be **very interested** in
	[CLG-T]	worth it to use because it will really get **a lot of interest [and] attention**
	[SHS-T]	Mas kita natin na parang **mas namomotivate** sila to attend their classes
	[CLG-T]	will help most of the student to be more **participative and interested**
	[JHS-T]	[addresses] the **attention-issue**... the feeling of being **bored**
Something **New**: *new, many, different, original; wonder, exploration, curiosity; perspective, experience, way, look, learning, environment, system, thing(s), feature(s), tool(s)*	[JHS-S]	**a whole new experience** and it's very entertaining
	[CLG-S]	more exciting since this is a **new thing**... or a **new perspective**
	[SHS-S]	students will be excited if there are **a lot of features**
	[CLG-S]	It would benefit... due to its **new look and new features**
	[JHS-S]	[using *avatars*] to entertain themselves and... para **makapag-explore**
	[SHS-T]	it would be better para **mas/may bagong environment / tool** yung mga students
	[JHS-T]	**new potential** LMS that could... improve the delivery of remote learning
	[SHS-T]	Parang they are **wandering** or... yung **curiosity** nila of the things
	[JHS-T]	to think of **original ways** on how to deliver their discussion or deliver the lesson
	[SHS-T]	[other platforms] have the **same basic features** that they can **already... navigate**
Something **Good**: *positive, benefit, cool, good, great, better, okay, most, best, worth, definite, step to*	[JHS-S]	I think it would be a **benefit** since... marami po siyang features
	[CLG-S]	It would **benefit**... some of our meetings and conferences **as well**
	[CLG-S]	[this] give students more mental involvement... and that's **good**
	[SHS-S]	[*head movements* are] a **positive thing** since the teachers can observe
	[CLG-S]	**it's okay, it's good as well** po... can also be a **good thing** for the teachers
	[SHS-T]	I both agree... **positive** talaga yung magiging outcome for the students / teachers
	[CLG-T]	it will really be **worth it**... get a lot of interest, attention, and... good interactive
	[CLG-T]	a **good step** towards a virtual classroom that is more conducive for the students
	[JHS-T]	it will **benefit** our classes... provide an engaging student-teacher learning process
	[SHS-T]	it's not just used for the **benefit of the student**, but also it **benefits the teachers**
Something **More**: *physical, mental, presence; easy, active, quick, effective, conducive, enhanced, more, improved, increased, enriched, promoted, helped, enabled, provided, contributed; ask, interact, focus, feel, communicate, engage, know, involve, participate, attract, comprehend, tell, understand, recognize, determine, voice, entertain, listen, collaborate, deliver*	[SHS-S]	**enhances** the virtual **interactions**... students would be **more focused**
	[CLG-S]	specially to **interact** with a student-& teacher **communication**
	[JHS-S]	**helps** the teacher **know** what emotions **nafe-feel** ng students
	[SHS-S]	the instructor **may be able** to tell if the participants truly **comprehend**
	[CLG-S]	give students **more mental involvement** especially in the classroom
	[JHS-S]	would **help a lot**... **help** them **voice out**
	[CLG-T]	as a part of the **engagement**... [so] students can **participate actively**
	[CLG-T]	*head movement* really **helps a lot**... [to] **understand** if the students dis / agreed
	[JHS-T]	use apps / programs [like this] that we could really **enrich the engagement**
	[SHS-T]	It **provides an interaction, yung engagement**, between the teacher / classmates
	[JHS-T]	this program can **help** the teachers as well to **enhance** their strategies
	[SHS-T]	**collaborative learning** could be **promoted** [through *roaming around*]
Something **Comfortable**: *hide, close, show, reveal, vocalize; face, camera, true self; nervous, shy, introverted, anxious*	[JHS-S]	**nakakahiya** pong umimik
	[SHS-S]	there are a lot of/some people who **don't want to reveal their faces**
	[JHS-S]	prefer na **hindi pinapakita** yung sarili nila
	[CLG-S]	we can **hide behind the camera** [since...] I'm a **shy** person
	[CLG-S]	I can **vocalize more** and I can **share more** if I am **closing my camera** or like that
	[CLG-T]	students really got **nervous, shy, and anxious** to turn on their cameras
Something **Else**: Current Platforms: *hard, can't, problems, accidents; cheap, storage, data, camera* Other Uses: *other, alternative, platform,* ***new normal****; meeting, assessment, quiz bee, talk show, performance task*	[CLG-S]	It would benefit some of our **meetings and conferences** as well
	[CLG-S]	[Using other platforms] **eats up a lot of storage** in our gadgets... trying to **update**
	[CLG-S]	trying to use **data**... it is **quite hard** for students who have low budget
	[JHS-S]	not all of the students **open their cameras** and **use their microphones**
	[CLG-S]	some of us have a **cheap webcam** just like mine
	[JHS-T]	**not literally replaces** but [is] at least an **alternative**
	[JHS-T]	it could transcend on the... **formative / summative assessments**
	[CLG-T]	**quiz bee / talk show**... we can use it for other **assessment / performance task**
	[SHS-T]	we can use this... as a **platform for other activities** like performance tasks with
	[SHS-T]	for teachers din, siguro, this simulation, din, we can use this in **faculty meetings**
	[CLG-T]	**not turning on their camera** because... [of] **problems- internet and power**

Table 1. Analysis on the Effects of AL in a VC

Overall, the sentiment of both sides is majorly **positive**, that this application will be something **good** or **beneficial** to the VC. A bulk of the reason why is in the way that it **adds more** or **helps to improve** some or many of the aspects of **interaction, communication, and engagement** between students and teachers, ideally making these processes **quicker and easier** or more **active and effective** through better **physical and mental presence of involvement** in the students. All of these are almost exactly in line with the results of Posey et al. (2010) and O'Brien and Iannone (2018). These will be expanded on further in the succeeding theme.

Aside from benefits to interaction, the novelty of using a **new platform or environment** with similarly **new, many, different, and original tools and features** grants a **new perspective and experience** and generates feelings of **wonder, exploration and curiosity**. Likewise, the use of game-like environment or tools, features, and elements spark a sense of **fun, enjoyment, and excitement in the students**, increasing the the rates of their **attention, interest, and motivation** in the classroom setting, more or less as Bojović et al. (2020) expected. And in other papers, engagement was correlated to **willingness and enjoyment** (Canpolat et al., 2015) elements of **humor** (Panepucci et al., 2021), lining up with the findings in this study. Like how (Berry, 2019) phrased it, effectively utilizing said online features is one step to increased community engagement.

Moving on, while less emphasized than the previous aspects, two other patterns were repeated in the transcripts. First of which is the sense of **comfort**. While only mentioned once by a single instructor on teacher's side, each of the three students made mention of the relation between **introversion** and the VC, concerns similar to ones stated by Simon (2022). More specifically, a sense of **shyness** and possibly **nervousness or anxiety** for some students when it comes to *opening their cameras* for *synchronous class sessions*. The student who brought this topic up went further, stating that they can *vocalize more* with the camera off, even stating that it is easier to "show my true attitude and true self in a virtual platform," when *Virtual Reality (VR)* was discussed.

Last comes the facet of being able to use **something else**, something that "not literally replaces but [is] at least an alternative" to current *online platforms in the* ***new normal*** like *Zoom* and *MS Teams*. This was brought up because 2 students and 1 teacher brought up some **technical difficulties** including but not limited to internet (speed), storage/data/power consumption, and camera/microphone quality, accessibility, and usage (also related to the *comfort* sub-theme), which were also mentioned by Bojović et al. (2020) and Djajadikerta et al. (2021). On a different note, 1 student and all the teachers discussed how the **Steam Classroom** can be improved to serve as a "platform for other activities," such as to meetings, experiments, and performance tasks, as well as other forms of *formative or summative assessments*, such as for laboratory simulations as suggested by Chan et al. (2021).

5.2 How the VC Acts as a Learning Environment

Theme: How the VC Acts as a Learning Environment		
Sub-themes & Keywords		**Excerpts**
The **Teachers**: *focus, interaction, communication, comprehension, agreement, opinion, mood, question, voice, concern, delivery, understanding, answer, presentation, discussion, behavior, participation, meaning, order, choosing, expression, listening, learning, attention, interest, assessment, motivation, recall, helpful; mental/physical presence/involvement*	[SHS-S]	enhances the **virtual interactions** since the students would be more **focused**
	[CLG-S]	specially to interact with a **student-&-teacher communication**
	[JHS-S]	kung paano po nila **ina-adapt yung naituturo** sa kanila while nakikinig sa teacher
	[SHS-S]	instructor may be able to tell if [they] truly **comprehend**... or... **misconceptions**
	[CLG-S]	especially if the student wants to answer, wants to **give his or her opinion**
	[JHS-S]	gestures will really help them **voice out**; like if they have **concerns**
	[JHS-T]	teacher... can identify how the students would **behave** towards the **discussion**
	[CLG-T]	a part of the **engagement**... [so] that the students can **participate actively**
	[CLG-T]	like nodding means **"agreeing"** or shaking the head means "**disagreed**,"
	[SHS-T]	students raise their hands... it is a **sign** that they are **engaged / participating**
	[JHS-T]	see who's **ready to answer / express their ideas** in the simulation
	[SHS-T]	It provides an **interaction, yung engagement**, between the **teacher** / classmates
Other **Classmates**: Students: *talk, interact, copy* Teachers: *interact, cooperate, collaborate, work together, group activities*	[CLG-S]	looking right at their classmates and **trying to copy their facial expression** as well
	[CLG-S]	I've tried [*VR*] once and I quite **interacted** with a lot of people more than... *Zoom*
	[SHS-S]	physical self will be transferred virtually... **interact** with the people / environment
	[JHS-S]	to **interact** with other... yung environment... same na ginagalawan ng lahat
	[SHS-S]	we want to **talk to our seatmate**... if it's too loud then the teacher can... scold us
	[SHS-T]	It **provides an interaction, yung engagement**, between the teacher / **classmates**
	[JHS-T]	The kids or the students can **work together** in coming up with an output.
	[JHS-T]	when we had the remote [setup]... **Collaboration is there but it's still different**
	[JHS-T]	**collaborative learning** could be promoted [through *roaming around*]
	[SHS-T]	when it comes to the **collaboration**... breakout rooms... for **group activities**
	[SHS-T]	we can see how they **cooperate, or... do collaborative work**
The **Environment**: *eye, look, better; curiosity, attention & interest, enjoyment; aura, presentation, environment, background, setup, seating arrangement;*	[JHS-S]	**environment**... sa **mga mata** ng students... ay isang **malaking factor** sa pakikinig
	[CLG-S]	what's missing is the **presentation** element... [like] the **blackboard**
	[JHS-S]	yung **environment** mo na yon parang same... kayo na ginagalawan ng lahat
	[JHS-T]	you are **curious** around the **environment** itself
	[JHS-T]	a **good environment**... could at least maybe **increase that attention and interest**
	[JHS-T]	more... they have **enjoyed**... in that **environment**... more that they could **recall**
	[SHS-T]	it would be **better** para mas/may **bagong environment** or tool
	[SHS-T]	There definitely is **difference yung aura** ng when you are in **a virtual setup**
	[CLG-T]	for improvement... The **backgrounds**..., **simulation room**... **seating arrangement**

Table 2. Analysis on the VC as a Learning Environment

As discussed in the previous theme, the *interactions in the VC* make up an entire thematic on its own, forming a majority of the opinions through the entirety of the two FGDs. This is then divided into 3 major sub-themes, namely the student interaction with the **teacher**, with **other students**, and then with the **environment**.

Regarding this thematic, the **Student-Teacher Communication** garners the most attention from the students and teachers, with generally the same opinions developed in both groups. Like what Johnston et al. (2005) and Joshi and Bodkha (2021), and Swan et al. (2000) mentioned, the teacher's "presence" is a critical factor to students by itself. The focus is on making the relationship between *speaker* and *receiver* based on the positive aspects of the **Steam Classroom**. This mainly evolves **making the communication and discussion process more interactive and engaging**. Other commonalities include **improving students' focus, attention, interest, recall, and mental presence/involvement** as well as their ability to adapt to the lessons, actively participate, express ideas, ask questions, and voice opinions/concerns. These are achieved through enabling or helping the teachers to **gauge student responses like comprehension, understanding, behavior, readiness, and agreement** in addition to being able to more easily **motivate students, lighten up the mood, create a learning conducive, environment, ask questions better (selection, willingness, and order), catch their attention or interest, engage students, and improve the delivery/presentation**. As Ioannidou and Konstantikaki (2008) and Ford (2021) both stated, the ability to express one's own feelings and empathize with others is a necessity in developing EI, and in turn, AL (Brown et al., 2020). In essence, all of the above aims make it "so that the interaction will be not only one-way from the student," making the shifting students from passive to ***active*** **listening**, a two-way, empathetic, and attentive approach (Khanna, 2020).

For the next two sub-themes, much less attention is given to such measures. However, that is merely in relation to the **student-teacher interactions** in the VC; they are still relevant enough to hold on their own. In the case of **Classmate Interactions**, Posey et al. (2010) has stated that environment within VC tend to have less options for classmates to interact or "bond" with each other, but more outside in regards to remote learning. Still, all participants made multiple mentions related to the importance of interaction among students, like in the findings of Gedera (2014) and Kuk et al. (2021), barring 1 instructor. For students, the ability to replicate situations similar to those in F2F classrooms, such as **talk or read faces**, was the primary motive. In contrast, the teachers honed in on being able to **collaborate** and **cooperate** though **group activities**.

Similarly, there is less priority given to **Environmental Interaction**, which might be explained by using a part of the results of Saleh et al. (2021). 2 students along with all the teachers respected its role in holding a proper VC. They all expressed that a **good environment or setup** is vital to improving the attentiveness of students, inclusive of factors such as **seating arrangement, groupings, and the classroom *feel***. Again, replicating the F2F classroom would do well for the VC, such as through discipline and motivation (Joshi and Bodkha, 2021).

5.3 Virtual Elements Replicating Physical AL

Theme: Virtual Elements Replicating Physical AL		
Sub-themes & Keywords		**Excerpts**
Emotion or Behavior: *show, know, tell, observe; behind camera; understand, comprehend, interpret; emotions, feelings, expressions; reactions, response, readiness, behavior;*	[CLG-S]	**showing** their **emotions**... while they are **behind the camera**
	[CLG-S]	just like... *Zoom*, we have **reactions** like the joy, thumbs-up, or clap motion
	[JHS-S]	*facial* ***reaction*** helps the teacher **know what emotions nafe-feel** ng students
	[SHS-S]	*facial* ***reactions*** since based on how the pupils' **faces react** the instructor is...
	[JHS-S]	madaling **malaman**... yung... **nafe-feel** with the **emotions and facial reactions**
	[SHS-S]	based on how their *faces react*, the **instructor... able to tell** [**comprehension**]
	[JHS-T]	[in] the simulated environment can identify how the students... would **behave**
	[SHS-T]	we can **see** how our students **react**... **nakikita** yung **response/reaction**
	[JHS-T]	we would **see who's ready** to answer / express their ideas in the simulation
	[SHS-T]	**behavior** of the students can be/also be **observed** in these *gestures*
	[CLG-T]	we **can see** if they're **ready to listen or if they are really into** the discussions
	[CLG-T]	they have the controls to **show** what **their emotions** will be
Idle or Static: ***not the usual "picture"***; *see, look, present, watch, show;* *avatar, customize, physical, virtual, gender, color; aura, presence, thought(s), others; setup, environment* ***there but not***;	[CLG-S]	**see** that students are quite listening... because that is **what they click on**
	[SHS-S]	**virtual avatar** will be more fitted to everyone
	[JHS-S]	mamimili sila ng hair-style, ng lips... sila po talaga yung **mag-cucustomize**
	[CLG-S]	I can **show** my true attitude and true self in a **virtual** platform
	[SHS-S]	it's like your **physical body** is there **but it's virtual**
	[JHS-S]	**you're there but you're not there**...
	[SHS-T]	parang we can **see an actual setup** in the/a face-to-face classes [or *simulation*]
	[JHS-T]	**looking at the/a good environment**... increase that attention and interest
	[CLG-T]	**feel the presence** of the students even if they are... not turning on their camera
	[SHS-T]	in a **virtual setup** na you **can see** your classmate na **may katabi ka**
	[CLG-T]	customize their own **avatars**... their **pinaka-basic feature nung kanilang face**
	[CLG-T]	maano ko yung kanilang **[gender] expression**, that's why... **avatar** works for us
Movement or Dynamic: Students: *see, look, perspective; first, second,* ***order***; *move, answer, raise, walk, speak, voice;* Teachers: *see, show, attract; direct, different; work, interaction, cooperate, collaborate; indicator, sign, signal, agreement, attention, meaning; movement, motion, raising (hand), nodding, bobbing, walking*	[SHS-S]	since everyone in the room can **see their "movements"**
	[CLG-S]	I was **looking around and trying to see** the whole place
	[JHS-S]	**medyo ginagalaw** ko rin po siya [the *head* or *camera*]
	[CLG-S]	especially if the student wants to **answer** [through ***raising-the-hand***]
	[SHS-S]	there are a lot of people who **want FPS** than other type[s] of **perspectives**
	[JHS-S]	yung environment mo na yon parang same... kayo na **ginagalawan** ng lahat
	[CLG-T]	because **they can see** the program / the **movements** and the facial reactions
	[SHS-T]	**motions** help in the virtual interaction because the teacher **can see**
	[JHS-T]	the more the **head bobs/move[s]** around **shows an indication** [of comfort]
	[JHS-T]	It's still **different if you could see**... [the *actual* ***raising***]
	[CLG-T]	**nakikita** natin kung sino **yung nagraraise** ng hand. So, for me, it's helpful.
	[SHS-T]	when students **raise their hands**... **it is a sign** that they are engaged
	[JHS-T]	**Collaboration** is there but it's still **different if you can see**
	[SHS-S]	teacher can observe if the pupils completely **agree**, by **nodding**
	[CLG-T]	**different meanings**... to the ***head movement*** like **nodding [agreeing]**

Table 3. Analysis of Virtualizing Physical AL Elements

The absence of non-verbal cues in *conventional* VCs is one of the foremost issues when it comes to remote learning (Swan et al., 2000). Moving forward with the meat of this study, the objective is to analyze the factors involved in *visualizing and virtualizing AL*. Specifically, the aim is to confirm which aspects of the programmed controls, the *facial expressions*, *head movement*, and *gestures*, contribute to an increased perception of AL in the **Steam Classroom** and VCs in general. In line with the concept of *visualizing* AL, common elements in each of three three sub-themes involve the use of **vision** to **see, sense, or perceive** the VC and its components, the **avatar, motions, and the environment**.

As Gedera (2014) and Cygan and Bejster (2021) stated, "human interactions", like in synchronous session, even through simple physical signs and signals is something that students will pay attention to. When it comes to **emotions and behavior**, the keyword is **reaction** of the **face**, one of the most obvious key "human" features. The students talked about how this allows the teacher to know how they respond to a trigger, such as their **emotions, feelings, and level of comprehension** towards the discussion, even **behind the camera**. Similarly, the teachers stated that this can be used to **understand** how their behavior, readiness, and feelings.

The **idle or static** elements server a more *passive* role wherein the user can **show or present** some constant (at least for the session) quality that others can then **see or look at**, such as using the **head position** and **idle gestures or *postures*** to display one's **behavioral state**, along with the suggestion to be able to **customize the looks and color of the avatar** to express **identity and gender**. The most important aspect is that just the **avatar** lends a sense of **physical presence** to all users, and, again, presence is an integral part to properly simulating the F2F classroom as an effective VC (Johnston et al., 2005, Swan et al., 2000).

Additionally, other unmoving elements such as learning materials **setup or environment** itself fall under the **static** category. However, they are not as relevant to AL and most details regarding it were already discussed in the previous **Environmental Interactions** sub-theme.

Lastly, the **dynamic or movement** elements mainly encompass the use of the **head movement and gestures**. This can be divided into two functions: being able to **see moving objects** and being able to **virtually move one's self**. When it comes to **body language**, (Brown et al., 2020) stated that there is a lot more to it that the **static** elements discussed before, specifically the ability to **look at another avatar** or choose a **posture**. In addition to using the concept of **presence**, the ability to do **physical gestures, mainly being able to raise the hand or nod or shake the head** in a VC increases the students' connection to the teacher and classroom (Joshi and Bodkha, 2021). Merely providing those **simple movements and a first-person perspective** seemed to increase interactivity and engagement, explained by Cheng and Tsai (2019) as due to providing a sense of "realism" and "freedom" in a way.

On a related note, the *college-level* student-teacher pair emphasized the **hand-raising gesture** in their separate FGDs as a means of **coordinating and ordering** when students ask questions. Specifically, they both brought up how traditional online platform that use a button mechanic is not enough when it comes to this issue. After all, **order** was previously used as an example by Posey et al. (2010) as one of the advantages of using a VC, albeit probably through a more visual or physical manner.

5.4 Extra: Negatives in the Steam Classroom

Theme: The Downsides		
Sub-themes & Keywords		**Excerpts**
Mentioned **Improvements**: *missing, improve, customize, presentation, environment, avatar, videos, teacher, avatar, roaming, groupings, color, expression, seating* and the current features	[JHS-S]	gawin po [**yung *environment***] mas... ano po **sa mga mata** ng students
	[CLG-S]	what's **missing** is the **presentation element** (e.g. blackboard, ppt)
	[SHS-S]	For the improvement, I think the ***gestures***
	[CLG-S]	need ng **videos / makapanood po ng videos** yung students
	[CLG-S]	in case they **can't speak** in a microphone and there will be a **thought bubble**
	[JHS-T]	maybe also... **for the teacher**, we could **add some gestures**
	[SHS-T]	the **customization of the avatar**, I think that's something **to be improved**
	[JHS-T]	if [the ***roaming***] **improvement** could be possible / could lead to a **good strategy**
	[SHS-T]	**breakout rooms** siguro... Just like the *Zoom / MS Teams*... for **group activities**
	[CLG-T]	in *Teams*... we have **seating arrangement**, like we're in [a realistic] **environment**
	[CLG-T]	mamiss/maano ko yung kanilang **[gender] expression**, that's why... **avatar** works
Movement as **Distractions**: Students: *distracting, can't listen, inattentive* Teachers: *negative, distracting; student, dependent, behavior, comfort; new, curious, anxious, first time*	[CLG-S]	somehow **distracting**... I can't listen **quite attentively**
	[JHS-S]	I find it **distracting** din po... **hindi nakakapakinig nang maayos**
	[SHS-S]	for the student perspective... Quite **distracting**, po
	[CLG-S]	the **"least"** command is yung ***head movements*** talaga [due to being ***distracting***]
	[CLG-S]	[when] walking around, there are some students who are really... **distracting**
	[JHS-T]	that **depends**, really, on **how the students also are behaving** on the other end
	[SHS-T]	Maybe a **distraction** since parang it is a **new** [thing]
	[JHS-T]	when it's **first time** you use it... you are **curious** around the environment itself
	[JHS-T]	if the **students** was able to point that out, **that says something about [the head] student as the best assessors** of everything that we're [teachers] doing
	[JHS-T]	[once] students would be able to control it... they would be more **comfortable**
	[JHS-T]	Like maybe they are **anxious**, so they are moving the cursor too much...
Difficulties: *fondness, prerequisites, challenges, not accepted, choice, age, control, miscommunication; start, first time, embrace, comfort*	[JHS-T]	has brought **a lot of**, yeah, **prerequisites** for all the people involved
	[JHS-T]	using these **different technologies**... is **not always accepted immediately**
	[SHS-T]	**not all educators** are... in an **age na that they can manipulate technology**
	[SHS-T]	the **older** generation... **Veteran / older**... **masyado nang mahabang** nagtuturo
	[JHS-T]	[student *expressions* are] something that we [teachers] **couldn't control**
	[JHS-T]	the student might be **not comfortable** on the other side [as **miscommunication**]
	[CLG-T]	We **can learn** from that naman... it will be **hard [just] for the first time**
	[CLG-T]	**challenges** on how we can instruct / use the Steam / log in

Table 4. Analysis of the Downsides to the Steam Classroom

The *downsides to the **Steam Classroom*** involves the **negative aspects** that come with its use, as a specific case or as a generalization for all or most VCs of a similar nature. They can be divided into three major problems: **improvements to be made**, **elements of distraction in regards to movement**, and **difficulties in using the application**.

First of which is that, as a *prototype* or early iteration, many **improvements** still have to be made, ranging from simple upgrades to the current features, additional tools and selections (especially for the **gestures**, and, as previously stated, **customization options for the avatar**. These all have the primary objective of **increasing or enhancing** the aforementioned elements of **virtual interaction**, such as through adding *teacher-specific gestures (e.g. praise for students answering)*, more varied and *behavior-based postures (e.g. thinking or behaving poses)*, or *other maps and environments (e.g. breakoutrooms, quiz bee room)*.

A bigger and actual issue is that, unanimously, the **students find the head-movement distracting**, also possibly *walking* if it is ever implemented, even if it comes with its own set of positive. When discussed in the *Teacher's FGD*, they did express some concern that, if the students, their **"best assessors"** found fault with it, then it does need some *looking into*. However, they also advised that this maybe due to the application or feature's aspect of being **new**, and would likely not be a problem after a certain amount of time.

The last issue that came up is *teacher-specific*: the **difficulty of use** for the application. To clarify, one of the teachers listed down that it would be **challenge** to **instruct** as well as **use or log into *Steam***, as they are not familiar with that service. They brought up that *new technologies* are rarely warmly welcomed right away, as one even mentioned that "using these *different technologies*... is not always accepted immediately." Furthermore, they also expressed their concern over how the **older generation of teachers** are able to **adapt to this platform**, if ever. Reports by Bojović et al. (2020), Djajadikerta et al. (2021) corroborate these worries, wherein some even some students are also struggling to catch up, as also pointed out by Blaine (2019).

6 Conclusions

Distance learning comes with a number benefits. The bulk are generally said to be related to the ease and conveniences that come when taking physical space out of the picture. The flexibility and self-sufficiency associated with remote learning are also well-liked. However, there are technicalities to take note of when handling these tools in education. However, *live* classrooms have certain elements that are difficult or impossible to reproduce. Much of these are *human* aspects found in F2F environments; the screen serves as a divide between and among teachers and students. Most notably, distance learning prioritizes oral and verbal interactions, leading to less attention provided to other, equally important factors in successful communication, resulting in more one-sided "talks", like using announcements and disseminations. The **more physical aspects of *Active Listening* such as body language and related forms of expressiveness in communication** (Behlau et al., 2021) are diminished due to many factors involved in the remote learning process.

Through the use of *Virtual Classrooms*, such as this **Steam Classroom**, this problem can be mitigated, specifically in regards to the addition of virtual and visual forms of **emotional**, **static**, and **dynamic** elements to the VC. In doing so, an **improvement** can be made to the **interactions between students and teachers, their classmates, and the virtual environment** itself, all of which vital to the classroom simulation. Aside from an improvement to the communication process, students will also find the application to be **something good, something fun, something new, something more, something comfortable,** and **something else**.

Still, nothing is perfect and that is especially true for new technologies or *prototypes*. First of all, a lot of **improvements** can still be made to the overall design, including but not limited to the upgrading adding more options to the current features, as well as implementing the suggestions made by the participants to further enhance the classroom atmosphere. Moreover, proper attention has to be given to the issue of **student distraction**, notably caused by some of the current controls related to movement, specifically the *head movement*. Finally, a discussion around the **difficulties in using the application**, particularly for the *older* and less *tech-savvy* instructors and even some students, is needed.

Still, as some of the participants have stated, this is a "good step" in the right direction when it comes to developing better forms of VCs. Ioannidou and Konstantikaki (2008) describe EI as the ability to understand and express one's feelings and empathize with others, and recommend that teachers develop this along with AL in their students. This should still be done in any classroom, virtual or otherwise, as a difference of platforms does not necessitate a change in the overall goals of education (Asim et al., 2020).

6.1 Limitations of the Study

As stated throughout this paper, the topics and discussion were focused on AL and, more specifically, its physical aspects. Along with that, the effects gauged were limited to the VC or a virtual context. Therefore, aspects unrelated to the two are, even if mentioned or explored, are of less importance and consequently less detailed. Moreover, the methodology for this research is entirely qualitative, with no numbers or calculations included. Likewise, the pool of participants is also of limited size, although with enough variation between both field of interest and professions.

6.2 Recommendations

Based on the described *limitations*, this study can still be refined further. Regarding the restrictions to physical AL in the context of the VC, making adjustments to the topic, similar to the case of Saleh et al. (2021), is a valid strategy. For a more empirical perspective, transitioning to a *quantitative* study is also an option, and will usually involve a larger sample size and a more objective point of view, depending on the new approach.

Regarding these approaches, targeting the non-physical aspects of AL, such as the other *core elements* listed by the United States Institute of Peace (n.d.). These where touched on in some parts of the paper, such as *student comprehension and understanding* being related to the ability to **paraphrase**, the students' *facial reactions* as a means of **reflection**, *asking questions* to exhibit the element of **clarification**, and, as the teaching participants mentioned, being able to **encourage** students through the use of *praise*. Findings resulting from gauging the relationship between AL and these factors in a VC would lead to a whole new line of inquiry.

Going back to the application, the **Steam Classroom**, exploring the *improvements* to be made in the **downsides thematic** could also show different results. For example, two of the more prominent subjects mentioned by the participants is the implementing functions that can enrich the **virtual avatar** and the **virtual environment**. The former usually involved being able to **customize** said avatar according to the students' tastes, such as by being able to replicate their *physical features*, which are diminished our outright absent in distance learning, as well as more *game-like* attributes like *color as a means of gender expression*. On the other hand, the capacity of the application to have a more varied selection of VCs has also been bought forth by both students and teachers, although much more emphasized by the latter group. They suggested being able to change the *classroom setup* to accommodate other forms of assessment, such as **group activities**, **performance tasks**, and other forms of ***summative* or *formative* assessments**, in addition to making the classroom more effectively *feel F2F*.

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