DOES PEDAGOGY MATTER IN VIRTUAL REMOTE TEACHING?: PERSPECTIVES FROM STUDENTS' VOICE

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ABSTRACT

This study is centered on investigating students' preferences and measuring the level of their virtual remote learning experience satisfaction in a university-level language course within the framework of Social Constructivism. Using mixed methods, data collection was made primarily through a survey and focus group discussions of college students' (n = 35) virtual remote learning experience utilizing a learning management system and other synchronous and asynchronous interactive applications. The study identified the instructional elements in the learning design that the students perceived as most important. It assessed the levels of students' satisfaction in terms of interaction, collaboration, and feedback support and examined if these variables are significantly different in Virtual Remote Teaching (VRT). It reported that the overall satisfaction level in VRT registered at 4.17 or interpreted as Exceptionally High. Further, the One-way ANOVA test revealed a p-value at 0.00000109, which is lower than the significance level at 0.05 and means that there is a significant difference between the three pedagogical elements or that they are unequal in VRT. Finally, recurring themes are identified in the students' expressed preferences. Instructor Interaction and Content Interaction are the two most mentioned codes that students identified as "the strongest element" of the course. Conversely, "teamwork or group work" is "the weakest factor" that students perceived as a gap in their learning experience in VRT. Based on the findings, sets of implications for virtual teaching practice are discussed in terms of course design and delivery, including the proper utilization of technology in higher education VRT.

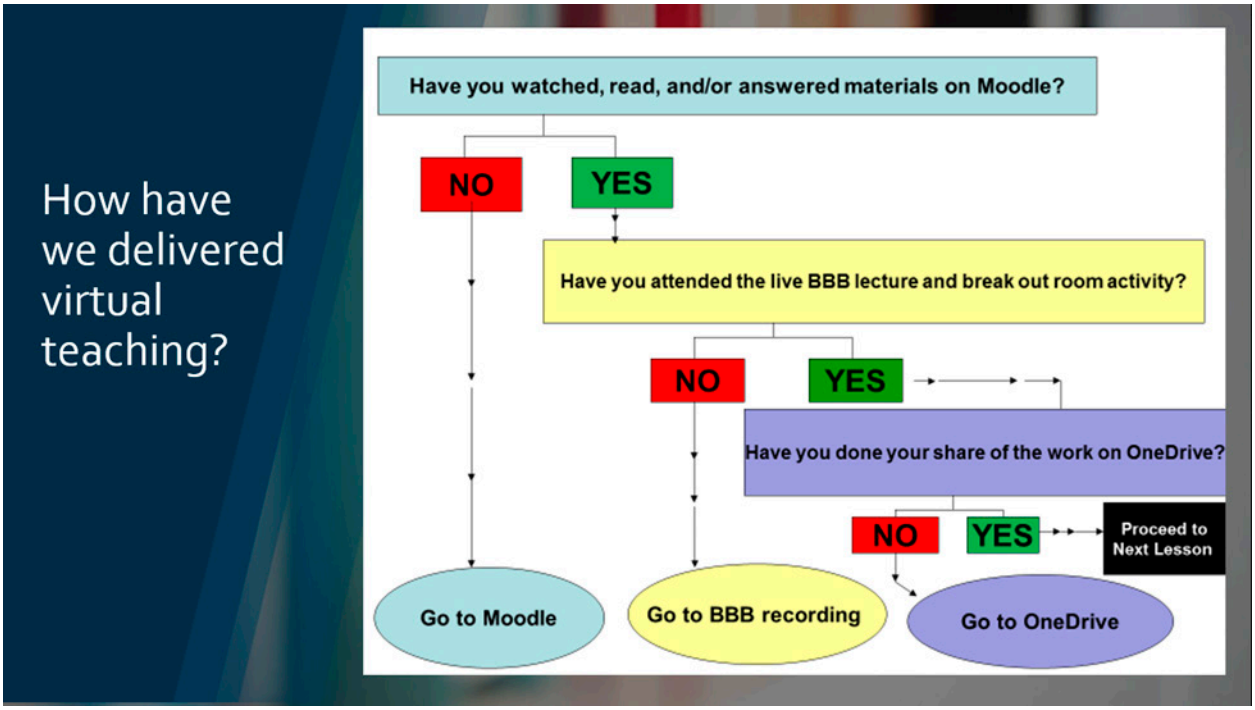
Keywords: *e-learning, virtual remote teaching, interaction, collaboration, feedback*

BACKGROUND OF THE STUDY

In response to the disruption of the pandemic caused by COVID-19, higher education institutions (HEIs) across the globe have shifted instruction to virtual remote teaching (VRT). However, since the second semester of the academic year 2021-2022, the delivery of instruction in most HEIs is gradually transforming into a new modality. From full VRT for the last three consecutive semesters, instruction has taken a new form of hybrid teaching. The hybrid teaching modality requires the delivery of instruction both face-to-face (F2F) and VRT (Rao, 2019). In the context of this current study, VRT is utilized for instructions while F2F is for assessments. The delivery of VRT has followed the following protocol shown in Figure 1.

The virtual delivery in the program has two submodalities: synchronous and asynchronous. The schematic diagram, as illustrated in Figure 1, shows the course delivery protocol for

Figure 1. Course Delivery Protocol for a Two-Session Weekly Cycle Instructional Loop



a two-session weekly cycle. To monitor students' track, a series of guide questions would have to be asked to check students' engagement in the instructional loop. The weekly cycle involves two pre-sessions, two live sessions, and an optional post-session. The pre-session utilizes Moodle, a learning platform or course management system, and is asynchronous where the students learn at their own time and pace. On the other hand, the second session, which employs BBB (Big Blue Button, a web conferencing system), is synchronous or in real-time and students learn together facilitated by the instructors. The post-session, which uses OneDrive, a cloud-based file-hosting app, is either synchronous or asynchronous. It can be synchronous when done together with the active support and guidance of the instructors. On the other hand, it can be asynchronous when done individually in isolation (Fabriz, *et al.*, 2021).

THE RATIONALE OF THE STUDY

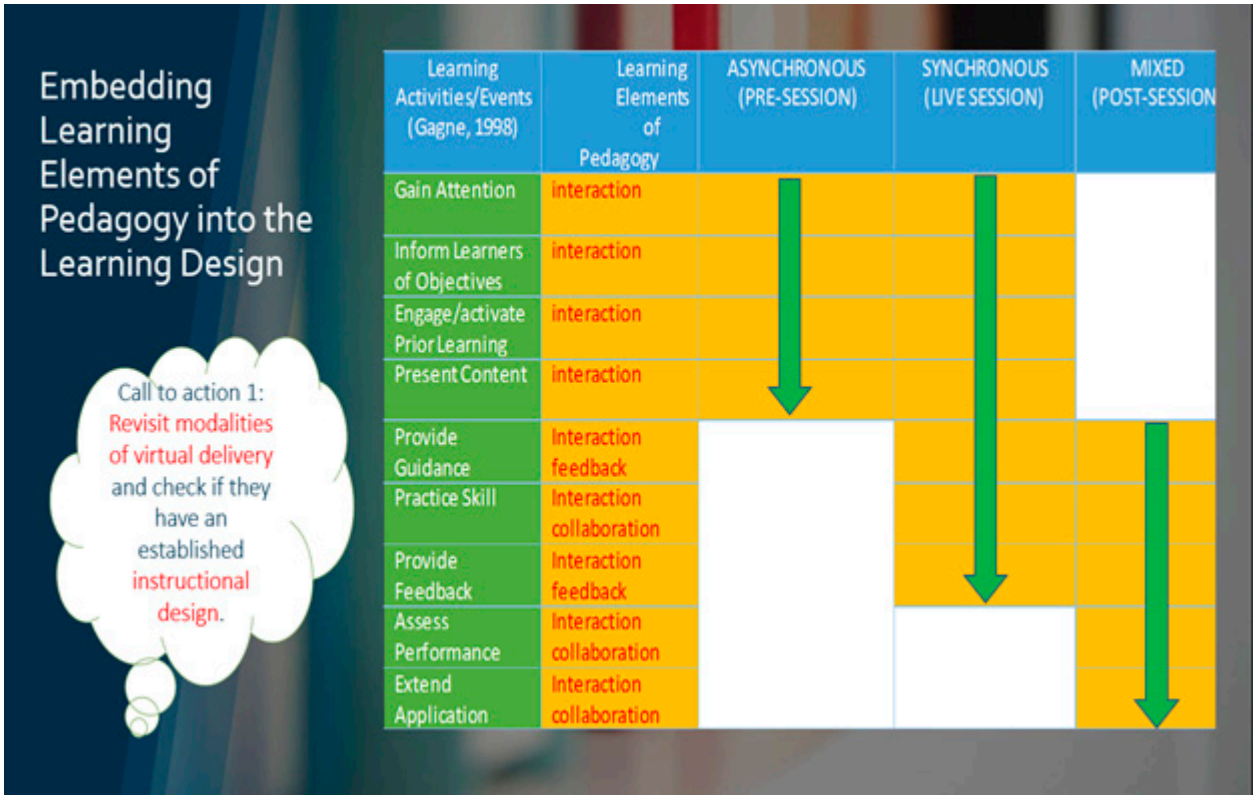
There is a dearth of learning theories or models leaning towards virtual remote teaching. However, there are established learning theories that have been modified to integrate the use of technology to achieve a better outcome in remote teaching. The goals of this enhancement in learning models are to put in place an added value to remote instruction by way of ensuring that despite the physical distance, remote teaching can provide meaningful engagement between and among learners, productive collaborative and cooperative groups, and pair work-based learning and timely and relevant feedback to stimulate reflection and support learning.

This current study investigates an emerging need to revisit the submodalities of VRT and evaluate if they followed an instructional design framework that is based on a social constructivist's philosophy that learners build knowledge not just on meaningful learning activities/experiences, but also on their interaction and collaboration with other learners (Ceesay, 2021; Garrison & Anderson, 2003). For instance, as shown in Figure 2, for VRT to sustain the element of interaction in an asynchronous session, it should have at least four layers of learning events, as covered by the green arrow. This is also true for the synchronous session, which should have at least seven layers of learning events to sustain the elements of interaction, collaboration, and feedback, as covered by the green arrow on the table.

DEFINING IDENTIFIED VRT NEEDS

Apart from the expected connectivity,

Figure 2. Elements of Pedagogy in Virtual Remote Teaching (VRT) under Gagne's Nine-Event Learning Design



accessibility, and technical issues, an equally important recurring concern that the program must face head-on is ensuring the quality of VRT. Ensuring quality means that VRT needs to have a sound learning design and pedagogical foundation (Luka, 2018). This is because, in a digital mode of instruction, only the medium or channel is changed. VRT is still a form of teaching that must have a learning process. It being such requires a learning design and a pedagogy, or the mechanism by which teaching is carried out. Learning design and pedagogy ensure that the teaching practice is in accord with the principles of teaching and learning, and would therefore warrant quality (Sobko, *et al.*, 2020).

Abdur Rehman, *et al.* (2021) reported that most failures of VRT to achieve instructional goals are due to the following factors: lack of interaction, low active collaboration, and insufficient timely feedback support. Recent studies on distance education learning environment have indicated that these factors had emerged when VRT is unable to embed an appropriate pedagogy into the learning design of VRT's delivery. Evidently, when interaction, collaboration, and feedback support are inadequate, the instructional goals are not consequentially meet. (El Refae, *et al.*, 2021; Moore, 2019).

STATEMENTS OF THE RESEARCH PROBLEM

The main purpose of this study was to determine the difference among perceived interaction, collaboration, and feedback support in a virtual remote language class. Specifically, it sought to answer the following questions:

1. What is the level of interaction, both asynchronous and synchronous, in the virtual remote class?
2. What is the level of collaboration in the virtual remote class?
3. What is the level of feedback support in the virtual remote class?
4. What is the level of overall satisfaction in the virtual remote class?
5. Is there a significant difference between interactions, collaboration, and feedback

support in the virtual remote class?

6. What are the recurring themes in the preferences of the students in their virtual remote class?
7. What are the implications of virtual remote teaching (VRT) practice?

Null Hypothesis (H_0): There is no statistically significant difference between interaction, collaboration, and feedback support in the virtual remote class.

LITERATURE REVIEW

This study is framed within the theory of Vygotsky's social constructivism, as explicated by Liu and Matthews (2005), and concretized in Gagne's nine-event instructional design model, as elucidated by Miner *et al*. (2015). It examines the three pedagogical elements of interaction, collaboration, and feedback support, and draws out their implications in VRT.

E-learning Theory: Constructivism in Synchronous and Asynchronous Online Sessions

VRT needs a framework by which teaching is delivered and learning can occur meaningfully. This framework can be a learning theory on which VRT can be modeled. One of the most relevant learning theories that is useful in bridging the existing gaps in VRT is social constructivism. Social constructivist theory frames learning as mainly a social problem-solving experience that is the basis of the knowledge-building process. It establishes Vygotsky's "zone of proximal development" (ZPD). In ZPD, the instructor provides an authentic social environment in which the context is familiar to the learners. From the social context, the learners can interact, negotiate, and collaborate with others to construct new knowledge necessary to solve the problem, thus narrowing the gap between what learners can do independently and dependently (Picciano, 2017).

Kurt (2021) summed the elements of a social constructivist theory in e-learning in synchronous and asynchronous online sessions as being able to provide learners with good interactive, collaborative, and cooperative learning activities, and the opportunity to reflect on the learning content especially on the feedback of the instructor. Tanis (2020) identified two activities that constitute two aspects of knowledge construction under a social constructivist perspective: (a) interaction with the learning materials or content and (b) interaction with other learners in which they discuss and develop understanding and competence. The social constructivist model emphasizes active and authentic task-based learning, which serves as the social and environmental context for structured collaborative interaction and from which feedback support for learning is generated. Hence, in a social constructivist virtual classroom, the main roles of instructors are as follows: (a) facilitates and scaffolds interactive activities built around learners' interest and prior knowledge; (b) creates collaborative dialogues by which learners can negotiate and construct knowledge together; and (c) provides timely and relevant feedback to learners based on performance assessments (Kurt, 2021). Squire (2022) explained in a study that the social constructivist model shows higher efficacy results in teaching and has better participation and satisfaction ratings from students.

Synchronous and Asynchronous Online Interactions

A sound learning design can activate learners' schemata. Activating prior knowledge and utilizing background knowledge to learn complex concepts require a sustained engagement among learners and between learners and instructors and learners and content. Although an interaction is normally facilitated through a synchronous session, VRT should be able to facilitate learner-content interaction as well as in an asynchronous session. Hence in VRT, class engagement must be stimulated through the three layers of interactions while leveraging the use of technology (Tanis, 2020). The social constructivist model posited that when there are multilayered interactions in activating prior knowledge, cognitive dissonance will ensue. Learners naturally build new knowledge when new ideas are presented to them along with age-level appropriate challenging activities. This learning condition will stimulate learners to reexamine their schemas in their minds and formulate new perspectives in analyzing and solving the problem (Kurt, 2021).

This view is supported by the community of inquiry model, which argues that in-depth, meaningful, and critical interaction in the educational experience is the main stimulator of learning (Reid-Martinez & Grooms, 2018). Garrison and Anderson (2003), who developed the model,

further explained that VRT must provide learners with social presence, cognitive presence, and teaching presence. Providing for self-paced structured learning that enables learners to interact independently in an online community of learners. In a study by Kyei-Blankson, *et al*. (2016), they revealed that learners perceived learner-instructor and learner-content interactions are essential elements of a high-quality learning experience in VRT. In addition, the learners also valued teaching presence as the most important interactive presence that increases behavioral and cognitive engagements in VRT (Dahleez, *et al*., 2021; Dwivedi, *et al*., 2019). Further, Falloon (2011), citing Moore's transactional distance theory, argued that the interactive element of VRT helps reduce learners' isolation by "humanizing" the virtual learning environment and thereby building a greater sense of community of learners who are motivated to learn. Therefore, the value of interaction in the VRT learning design is that it should be able to stimulate and motivate higher-order thinking skills despite a physical divide. Through shared assignments, pair and teamwork, and study teams, learners' dialogue or exchange of ideas in a virtual learning environment is facilitated, which eventually leads to the creation of new and meaningful knowledge (Suryawanshi & Suryawanshi, 2020).

Collaboration

Magen-Nagar and Shonfeld (2018), concerning Vygotsky's social constructivism theory as explicated by Liu and Matthews (2005), defined collaboration as a group of individuals with diverse viewpoints working together and actively contributing intellectually to achieve a goal. Hence, social collaboration is an indispensable condition for learning and cognitive development. In the same vein, Moore (2016) reported that as an outcome of collaborative engagement the group's zone of proximal development (ZPD), or the space between what the learners can do independently and what they can do with the guidance of an instructor, can be narrowed because of social mediations, such as multiperspective discussion and socio-cultural approaches to problem-solving when collaboration is facilitated in online learning. Further, in their study on online learning environments, Reid-Martinez and Grooms (2018) explained that when learners collaborate, there is social dialogue and peer negotiation that enables them to develop an in-depth and wider perspective of real-world problems.

The 5E model to a guided inquiry is a specific approach to embedding the instructional element of collaboration in VRT. The model embeds the social constructivist philosophy in which the first two stages involve engaging learners to activate their prior knowledge and interests and providing learners the opportunities to collaborate in authentic or real-world tasks (Afify, 2018). In a study of online learning technologies, Harasim (2021) explained the concept of online collaborative learning (OCL) as an approach to integrating the pedagogical element of collaboration in the delivery of VRT. The approach provides for collaborative opportunities for learners of different performance levels to work together toward a common instructional goal under computer-mediated communication and network learning (Ajayi & Ajayi, 2020).

When there is an element of collaboration in VRT's pedagogy, cognitive and affective benefits ensue. Rajabalee, *et al*. (2020) reported that collaboration in VRT has a positive influence on the students' academic performance. In addition, Magen-Nagar and Shonfeld (2018) revealed that collaborative activities in VRT decreased technological anxiety, improved self-confidence, and increased productivity and performance. Furthermore, Ismailov and Laurier (2021) elucidated that increases in learners' collaboration led to a learner's higher commitment due to socialization experiences that learners are immersed in as active, direct participants of the knowledge-building process. Thus, learners' perception of the level of collaboration in VRT plays an important role in ensuring the quality of learning and achieving high learner satisfaction.

Feedback Support

From a social constructivist's perspective, Askew (2000) defined feedback as a dialogue between the learner and the instructor about the latter's judgment of the former's strengths, weaknesses, or areas for improvement in the performance of a given task. Feedback is primarily seen as learning support and as a catalyst for reflective learning. For feedback to serve its purpose of supporting learning in VRT, it must be given promptly to identify gaps in their performances. The physical divide between the learner and the instructor in a VRT environment requires efficient delivery of

feedback to mediate performance. It must be also given constructively to motivate self-confidence in learners (Northern Illinois University Center for Innovative Teaching and Learning, 2020).

Hattie and Timperley (2007) proposed a model of feedback that is anchored to answer four questions from the point-of-view of a learner, namely: Where I am going?; How am I going?; Where I am now?; and How will I get there? Effective feedback supports the learner to close the gap between their current performance and the target performance. An instructor, therefore, needs empirical evidence that can be collected through observation or analysis of the learners' performance utilizing a criterion-referenced tool such as a rubric. In VRT, the rubric is dynamic or *live* online. The descriptors in each criterion in the rubric that categorically described the current performance of the learners can be highlighted to serve as formative or summative assessment feedback. A screencast or video-enabled application can also be utilized to communicate this feedback if it is not logistically possible to confer it to learners synchronously in one-on-one sessions (Rao, 2021). Along this purview, Askew (2000) maintained that effective feedback should transcend from task or performance level up to the process level in which students reflect on specific learning strategies, and finally, up to the self-regulation level where students themselves monitor their learning. Effective feedback, therefore, stimulates reflection on student's awareness of the process by which they construct knowledge.

Gagne's Nine-Event Learning Design and the Pedagogical Elements

Gagne's nine-event instructional design model, as explicated by Miner, *et al*. (2015), incorporates the three social constructivist pedagogical elements: interaction-engagement, collaboration, and feedback-reflection. The main contention of the model is that optimum learning cannot be achieved unless the learners are stimulated systematically and holistically in a series of instructional events. The first three are gaining attention, informing learners of objectives, and stimulating recall of previous learning and are designed to engage or interact with learners. The second three are presenting stimulus material, providing learning guidance, and eliciting performance, and they are intended to create collaboration. Finally, the last three are providing feedback, assessing performance, and enhancing retention and transfer, and they are to provide feedback support and opportunity for reflection (Gagne, *et al*., 1998).

In a recent study on online university education in Australia by Stevens, *et al*. (2021), they reported that when online content is purposively developed to support student investigation or inquiries, specifically in the first six instructional events, better learning outcomes can be achieved. It is worth noting that the nine events are chronologically sequenced and logically arrange to scaffold or build on each other. Scaffolding is a metaphor referring to the layers of supportive assistance or guidance instructors extend to learners to enable them to narrow the gap in their zone of proximal development (ZPD) (Dabbagh, *et al*., 2018). Scaffolding is mostly evident in the second three of Gagne's model. In presenting the stimulus material, concepts must move from abstract to concrete or simple to complex. In the same manner, in eliciting performance, skills must develop from low low-order thinking skills to high-order thinking skills such as analysis, synthesis, evaluation, and creation (Suryawanshi & Suryawanshi, 2020). In VRT, asynchronous and synchronous lessons must embed the nine events of instructions so that scaffolding can properly operate as a mechanism to deliver teaching with the pedagogical elements of interaction, collaboration, and feedback support building on each other (Dabbagh, *et al*., 2018).

METHODOLOGY

Participants

Thirty-five (35) university students enrolled in an English language course participated in the study. The participants were randomly selected using a lottery technique across the four covered language course classes with a total of one hundred (100) students. The number of participants represents 35% of the population size.

To eliminate demographic and proficiency biases, proportionate sampling for males and females with mixed-level language proficiency was ensured in each class. A total of sixteen (16) males and nineteen (19) females at a median age of 19 and an average B2 language proficiency level under the Common European Framework of Reference (CEFR) participated in this study. B2 level students had the following language competencies: They

can understand a complex reading text and write a composition with a clear viewpoint utilizing advantages and disadvantages, and they can interact with a degree of fluency and spontaneity.

Research Design and Procedures

Since the main objective of this study was to determine the difference among perceived interaction, collaboration, and feedback support in a virtual remote learning experience of a university-level language course, data were collected primarily utilizing mixed methods. A survey was used to measure the level of the perceptual experience of participants and supported by focus group discussions (FGD) to identify recurring themes in the virtual remote learning preferences of students in a hybrid language course utilizing a learning management system (LMS), video conferencing platforms for synchronous classes, and a cloud-based collaborative platform, and other interactive applications for asynchronous sessions.

The study included three stages of data processing: preliminary protocols, primary data collection, and primary data analytics. In the first stage, the written approval of the university was sought. After permission was granted for the study, the free, prior, and informed consent, within the purview of personal data protection statutes, from the participants was secured.

In the second stage, which involved primary data collection, the electronic survey questionnaires from the participants were distributed and retrieved. Subsequently, a series of separate FGD sessions online using a video conferencing platform for each covered class was conducted. The FGD sessions observed the following guidelines: First, the facilitator introduced the FGD and its rationale and objectives; second, the participants were asked to introduce themselves by stating their names and their ID numbers; and third, the participants were asked about their virtual remote learning experience, specifically on a workshop on writing a proposal report. Each participant was given time to speak and the opportunity to agree or disagree with the other participants' opinions. On the other hand, the facilitator took cues from the explanation of each participant and drew more insights and probing responses. Finally, the facilitator summed up proceedings and asked if the participants had other things to add, after which the facilitator thanked the participants and closed the FGD. Collection of primary data commenced on the eighth week and ended on the sixteenth week of the second semester or for a period of nine consecutive weeks of the academic year 2021-2022. The retrieval rate of electronic survey questionnaires and the participation rate in the FGD sessions among randomly selected participants were both at 100%.

In the third and final stage, the collected primary data were processed. The responses generated from electronic survey questionnaires were tabulated and computed for the means and significant differences. FGD recordings were transcribed and coded for analysis using qualitative data processing software. Finally, recurring themes and patterns of preferences expressed by the participants during the FGD sessions were coded and classified into themes. Each theme had two subclusters based on recurring patterns, specifically the strongest element and the weakest element of the language course that the respondents perceived.

Research Instruments

To ensure the reliability or internal consistency of all items on the electronic survey questionnaire, a Cronbach alpha test was conducted. The test yielded a value of .87 or 87% interpreted as Very High Consistency. To ensure the validity of the focus group discussion guide questions, the guide was validated by tenured senior language faculty members of the English program of the university. The guide contained open-ended questions inquiring about the participants' perception of their virtual remote learning experience during the proposal writing workshop, such as interactive content experience, collaborative activities experience, and feedback support received.

The questions in both instruments were organized into two sections. The first section inquired on perceived levels of content interaction and feedback support in terms of listening, note-taking relevant information from audio-visual recordings, receiving feedback for the notes, and writing, based on their notes, a 300 to 350-word, four-paragraph report utilizing mainly comparison and contrast persuasive writing method structured using the CERA (claim-evidence-reason-action) framework. The first three activities involved synchronous interactions while the last one was asynchronous. All these were carried out through the LMS of the course, specifically its quiz auto feedback feature and plugins that enabled breakout room video

conferencing, as well as another that embedded audio-visual recordings into the LMS.

Its second section queried perceived levels of collaborative activities and feedback support during the post-writing stage, particularly in terms of peer and instructor feedback received during guided peer review and conference sessions. Utilizing the peer review and breakout room features of the LMS and cloud-based interactive software, participants were given a series of peer review training sessions focused on how to use the online, rubric-based checklist and evaluation form to give feedback on the global (content and organization) and local (grammar and vocabulary) aspects of their peers' writings. The checklist prompted participants to examine their peer's writing and look for evidence in terms of content, organization, and cohesion requirements to support their feedback. The evaluation form elicited from the participants their qualitative opinions about the quality of the writing of their peers and how their peers can improve their writing. Their feedback was supported by evidence indicated in the checklist. The two forms were the bases of the post-review conference. Subsequently, participants conferred to negotiate and mediate the feedback given and received; to clarify, justify, and confirm content and language; and to elicit and prompt ideas from each other before they act on the feedback for revisions. Instructor's intervention was only required in instances when participants could not agree with each other.

DISCUSSION OF QUANTITATIVE RESULTS

Levels of Pedagogical Elements

The perceived level of VRT asynchronous interaction is at 4.8 out of 5.00 or interpreted as Exceptionally Very High. This means that in terms of VRT asynchronous interaction, the respondents are 91%–100% satisfied. Conversely, the perceived level of VRT synchronous interaction is at 4.48 out of 5.00 or interpreted as Moderately Very High. This means that in terms of VRT synchronous interaction, the respondents are 81%–90% satisfied. These confirm the findings of Kyei-Blankson, *et al*. (2016), who report that learners perceived Instructor Interaction and Content Interaction as important elements to achieve high satisfaction in the VRT learning experience. This implies that students regard interactive activities as stimulators of their active engagement in VRT.

On the other hand, the perceived level of synchronous collaboration in VRT is at 3.58 out of 5.00 or interpreted as Moderately High. This means that in the aspect of VRT collaboration, the respondents are 61%–70% satisfied. This supports the findings of Magen-Nagar and Shonfeld (2018), who assert that if learners' perception of collaborative activities in VRT is not favorable, it could not lead to lesser technological anxiety, improved self-confidence, and higher productivity. Hence, students perceive collaboration through peer engagement as a factor that can enhance their performance.

Finally, the perceived level of VRT synchronous feedback support is at 3.85 out of 5.00 or interpreted as Exceptionally High. This means that in terms of VRT synchronous feedback support, the respondents are 71%–80% satisfied. This confirms the finding of Askew (2000), who contends that feedback support is an essential element for VRT satisfaction. This implies that students see feedback support as an inducer of reflection that raises their consciousness on the process by which they create knowledge and learn. See Tables 2–5 in Appendix B for these data sets.

Level of Overall Satisfaction

Generally, the perceived level of overall satisfaction in VRT is at 4.17 out of 5.00 or interpreted as Exceptionally High. This means that in terms of VRT overall experience, the respondents are 71%–80% satisfied. This confirms the findings that learners valued teaching presence, specifically in terms of learner-instructor interaction, and perceive it as an indispensable element in the VRT that stimulates behavioral and cognitive engagements and satisfaction in VRT (Dahleez, *et al.*, 2021; Dwivedi, *et al.*, 2019). See Table 6 in Appendix B.

Significance of Differences

Table 7 presents the *p*-value of the One-way ANOVA test at 0.00000109, which is lower than the significance level of 0.05. This means that there is a significant difference between the three pedagogical elements. Hence, the null hypothesis is rejected. This implies that the elements are unequal, or each is a significant factor in achieving satisfaction in the VRT experience as perceived by the students.

Therefore, it can be explicated that asynchronous and synchronous interactions, collaboration, and feedback support are essential pedagogical elements that must be embedded

Table 7. Significance of the Difference in VRT

p-value	Significance Level	Decision	Meaning
0.00000109	0.05	Null Hypothesis Rejected (Sig)	There is a significant difference between the pedagogical elements.

consistently throughout the course in terms of design and delivery. This supports the assertion of Dabbagh, *et al.*, (2018), who contend that the course itself must incorporate Gagne's nine events of instructions to embed all pedagogical elements and achieve an effective instructional delivery. This further implies that the course design is not limited to establishing the nine events of instruction, but it also must ensure that in each event the pedagogical elements are entrenched through the creation of specific teaching and learning activities that promote interaction and engagement that consequently stimulate active learning.

DISCUSSION OF QUALITATIVE FINDINGS

Common Themes of Preferences

Table 8 reveals the recurring themes in the students' expressed preferences. Content Interaction at 20.3% and Instructor Interaction at 17.6% aggregate frequency count distribution are the two most mentioned codes, in ranking order, that students identified as "the strongest element" of the course design. Instructor Interaction, as defined by respondent SS26, refers to how the lessons are organized and paced by the instructor. Respondent SS28 explained by saying that "I like the interactive activities that our teacher prepared for us." On the other hand, respondent SS14 put a perspective on what Content Interaction is by saying that "I like the writing practice activities that we can do on our own and receive feedback." Respondents SS5 and SS18 expounded on the nature of these practice activities as "…challenging but can help you really think."

Conversely, "teamwork or group work" is "the weakest element" at 27% frequency count distribution, which students perceived as a gap in their learning experience in VRT. Respondent SS25 explained that it refers to the need "to interact more and get to know each other better in groups or in pairs." Respondent SS32 lamented that "some students do not cooperate during group work like peer review with limited time, so I guess we need more time for team activities to really get the work done." This sentiment is echoed by responded SS10 by saying that "there is not much time to work together in writing activities." Hence, it can be inferred that this perceived gap in instructional delivery is partly caused by inadequate instructional time allocated for "teamwork or pair work" in the learning design. Specifically, respondent SS20 pointed out that "I think we need longer time in Big Blue Button breakout rooms and OneDrive doing writing tasks." Respondent SS34 valued "teamwork or group work" as "activities that can help us share and learn from each other."

Table 8. Matrix of Themes and Frequency Distribution

	Count	% Codes	Cases	% Cases
Interaction				
Strong Instructor Interaction	13	17.6%	13	37.1%
Strong Content Interaction	15	20.3%	15	42.9%
Strong Learners Interaction	1	1.4%	1	2.9%
Weak Instructor Interaction				
Weak Content Interaction	3	4.1%	3	8.6%
Weak Learners Interaction	1	1.4%	1	2.9%
Collaboration				
Strong Teamwork or Group Work				
Weak Teamwork or Group Work	20	27.0%	20	57.1%
Feedback Support				
Strong Feedback Support	10	13.5%	10	28.6%
Weak Feedback Support	2	2.7%	2	5.7%
Undecided				
Undecided on Strenght				
Undecided on Weakness	9	12.2%	9	25.7%

The findings on interactions with the instructor and content as the strongest pedagogical elements in the course support the contentions of Dwivedi, *et al.* (2019) and Dahleez, *et al.* (2021), who assert that the teaching presence of the instructor is the most important interactive component that increases behavioral and cognitive engagements

in VRT. This implies that students see interaction as an indispensable component of the course that can lead to a high-quality learning experience in VRT. On the other hand, the finding on teamwork or group work as the weakest pedagogical element in the course confirms the study of Magen-Nagar and Shonfeld (2018), who explicate the importance of group work by arguing that collaborative activities in VRT can result in decreased technological anxiety, improved self-confidence, and increased productivity, performance, and learning satisfaction. Since there is a perceived insufficiency of this element in this course, the students pointed it out as a gap in their learning experience in VRT. Hence, this implies that learners' perception of the level of collaboration in VRT plays an important role in ensuring quality of learning and achieving a high satisfaction rating.

DISCUSSION OF MIXED METHODS RESULTS: IMPLICATIONS TO PRACTICE

Managing Interaction in VRT

Although both asynchronous and synchronous interactions in the course are perceived generally as "very high," its component on Learners' Interaction registers at only 1.4% in the frequency distribution of perceived pedagogical strength. It has the lowest count among the three components of interaction and implies that the gap in which the interaction level can be refined is identified. Improving the aspect of interaction-learners relates mainly to synchronous interaction or when the learners have real-time engagement with other learners (Moore, 2019). Hence, this calls for the purposeful utilization of the interactive poll features of the LMS video conference platform to encourage students' social engagement. A poll-based quiz for groups and an intriguing problem-solving with interesting audio-visual or anecdotes for pairs can be created at the beginning stage of the online class. Occasionally, the video conference plugin of the LMS can be complemented with interactive applications to serve this purpose.

Managing Collaboration in VRT

Collaboration in the course registers the lowest perception, which is seen as "moderately high" in terms of strength. In addition, it is also perceived as the "weakest pedagogical element" of the course at 27% frequency count distribution. This implies that the weakest instructional element from which the course can be improved is identified. To address this, the breakout room feature of the LMS's video conference and the cloud-based collaborative plugins should be used regularly and on a specific topic with relevant instructional purposes. Further, instructors can create collaborative learning activities such as group discussions on case studies, small-group projects, simulation exercises, and peer review sessions that can be carried out synchronously or asynchronously (Reid-Martinez & Grooms, 2018).

Using the breakout room, for example, instructors should first communicate short but clear expectations for the group activities. For instance, an instructor would tell students that when they are in the breakout rooms, it is expected that they think actively about the task, negotiate their thoughts with their group mates, and then confirm what they have concurred on (Isamailov & Laurier, 2022). Eventually, as a learning community, they share with other groups their group's findings or perspectives through a presentation or role-playing. This could take place when the class is back in the main room.

In addition, the instructor can set up a shared online database like a cloud-based collaborative application for students to asynchronously work together beyond class hours. The application is suited to promote teamwork specifically for complex tasks that require an extended collaboration timetable. Using the application, an instructor should ensure that a task is broken down into smaller related chunks of learning activities to provide scaffolding support and avoid cognitive overload, a condition in which students could no longer absorb or process given information (Moore, 2019). In addition, the instructor can set up an asynchronous forum or an online group discussion board focused on a topic on a particular project like a case study or research. This regular collaborative learning activity allows students to negotiate meaning and share and annotate documents according to their diverse and shared perspectives (Harasim, 2012).

Managing Feedback Support in VRT

Feedback support in this course is perceived as "exceptionally high"; however, 5.7% of the cases in the frequency count distribution consider feedback support as the "weakest pedagogical element" of the course. Nevertheless, this implies that there is

still space to bridge this gap in the VRT. There are several opportunities in which feedback support can be given by the instructor during synchronous sessions designed under Gagne's nine events of instruction. During the gaining attention stage, an instructor could give real-time feedback in the form of answers to questions in group interactive games like a poll-based quiz. Moreover, during the eliciting performance stage, an instructor can virtually move around breakout rooms and give timely and constructive feedback on students' task performance and get those underperforming students back on track. Finally, in the assessing performance stage, an instructor can set up a real-time one-on-one or paired web conference to explain the feedback and give learners a chance to interact with other learners and the instructor regarding the feedback. Alternatively, screencast-based feedback can be given to serve this purpose (Gagne, *et al*., 1998; Stevens, *et al*., 2021). Similarly, a cloud-based collaborative application can be utilized for group-based feedback like peer review sessions. Students can follow their instructors and their peers' feedback in one shared document. Students would see if they were able to act on the feedback and make progress from it on their assigned work. This can be a catalyst to encourage students to monitor and self-regulate their learning (Askew, 2000; Hattie & Timperley, 2007).

CONCLUSIONS

This study sought to examine, utilizing the social constructivism framework, the difference between perceived pedagogical elements of VRT. Based on the findings, the following conclusions are drawn: The level of perceived asynchronous interaction in the course is at 4.8 or Exceptionally Very High while the level of perceived synchronous interaction is at 4.48 or Exceptionally High. On the other hand, the level of perceived collaboration in the course is at 3.58 or Moderately High while the level of perceived feedback support in the course is at 3.85 or Exceptionally High. Furthermore, the level of perceived overall satisfaction in the course is at 4.17, or Exceptionally High. Finally, the One-way ANOVA test revealed a *p*-value at 0.00000109, which is lower than the significance level at 0.05 and thus rejects the null hypothesis. It can therefore be concluded that there is a statistically significant difference in interaction, collaboration, and feedback support that implies the pedagogical elements are unequal, or each has a significant role to play in VRT design and delivery.

In light of these findings, it is worth noting that the recurring themes of Instructor Interaction and Content Interaction are the two most mentioned codes that students identified as "the strongest element" of the course. Conversely, "teamwork or group work" is "the weakest factor" which students perceived as a gap in their learning experience in VRT. The implications to teaching practice are the need to strengthen the synchronous Interaction Learners component of VRT, to improve the collaborative learning activities, and to enhance the feedback support in the course design and delivery utilizing appropriate technology. This study recommends that similar studies be conducted to examine the influence of these pedagogical elements, specifically, on the academic performance of students in a virtual or a blended learning environment to verify the findings in this study and to determine if satisfaction level is indeed significantly related to academic performance.

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This report is my original work.

CONFLICT OF INTEREST:

None.

ETHICAL CLEARANCE:

This study was approved by the institution.

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APPENDIX A

Table 1. Rating Scale for Mean Interpretation

Point Scale	Range Interval	Descriptive Rating	Meaning
5	4.76-5.0	Exceptionally Very High	This means that the satisfaction level is 91% to 100%.
	4.5-4.75	Moderately Very High	This means that the satisfaction level is 81% to 90%.
4	3.76-4.49	Exceptionally High	This means that the satisfaction level is 71% to 80%.
	3.5-3.75	Moderately High	This means that the satisfaction level is 61% to 70%.
3	2.76-3.49	Exceptionally Average	This means that the satisfaction level is 51% to 60%.
	2.5-2.75	Moderately Average	This means that the satisfaction level is 41% to 50%.
2	1.76-2.49	Moderately Low	This means that the satisfaction level is 31% to 40%.
	1.5-1.75	Extremely Low	This means that the satisfaction level is 21% to 30%.
1	1.26-1.49	Moderately Very Low	This means that the satisfaction level is 11 to 20%.
	1.0-1.25	Extremely Very Low	This means that the satisfaction level is 0 to 10%.

APPENDIX B

MEANS AND SIGNIFICANCE ON DIFFERENCE

Table 2. Level of Perceived VRT Interaction Asynchronous

Mean	Descriptive Rating	Meaning
4.8	Exceptionally Very High	This means that the satisfaction level is 91% to 100%.

Table 3. Level of Perceived VRT Interaction Synchronous

Mean	Descriptive Rating	Meaning
4.48	Exceptionally High	This means that the satisfaction level is 71% to 80%.

Table 4. Level of Perceived VRT Collaboration Synchronous

Mean	Descriptive Rating	Meaning
3.58	Moderately High	This means that the satisfaction level is 61% to 70%.

Table 5. Level of Perceived VRT Feedback Support Synchronous

Mean	Descriptive Rating	Meaning
3.85	Exceptionally High	This means that the satisfaction level is 71% to 80%.

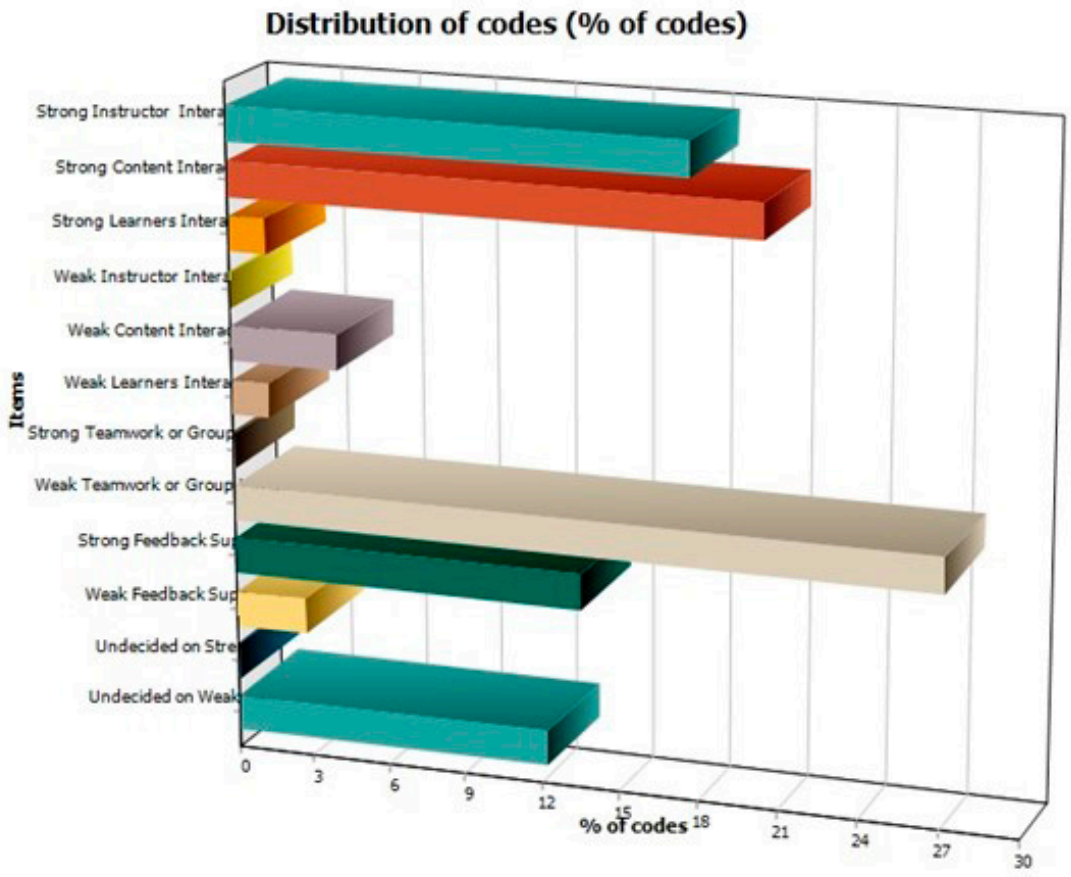
Table 6. Level of Perceived Overall VRT Learning Experience

Mean	Descriptive Rating	Meaning
4.17	Exceptionally High	This means that the satisfaction level is 71% to 80%.

APPENDIX C

RECURRING THEMES AND CODES

Table 9. Frequency Distribution of Recurring Codes



APPENDIX D

FGD Coded Transcript Tabulation

Category	Code	Case	Text	Coder	% Words	Variable
Collaboration	Weak Teamwork or Group Work	SS1	More time for group works.	Admin	7.7%	DOCUMENT
Feedback Support	Strong Feedback Support	SS10	I like the reading and writing exercises because I get feedback for my answers right away.	Admin	19.5%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS10	Yes, that's true. I think there is not much time to work together in writing activities.	Admin	20.7%	DOCUMENT
Interaction	Strong Content Interaction	SS11	Lesson are easy to understand really.	Admin	9.1%	DOCUMENT
Interaction	Weak Content Interaction	SS11	Can we have more Kahoot games? They're fun and interactive.	Admin	16.7%	DOCUMENT
Interaction	Strong Instructor Interaction	SS12	I love the interactions with my teacher during online class.	Admin	14.9%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS12	More time to interact with my classmates.	Admin	10.4%	DOCUMENT
Interaction	Strong Instructor Interaction	SS13	Yes, I agree (teacher interaction).	Admin	7.7%	DOCUMENT
Undecided	Undecided on Weakness	SS13	It's all good for me. Nothing needs to be changed.	Admin	16.9%	DOCUMENT
Feedback Support	Strong Feedback Support	SS14	I like the number of practice I got to the do and the feedback I received.	Admin	17.6%	DOCUMENT

Interaction	Strong Content Interaction	SS14	I like the number of practice I got to the do and the feedback I received.	Admin	17.6%	DOCUMENT
Feedback Support	Weak Feedback Support	SS14	sometimes feel that group activities ineffective because some students are not doing the task seriously. I think more guidance for group activities is needed.	Admin	26.4%	DOCUMENT
Interaction	Strong Content Interaction	SS15	Online classes are clear, well organized and lessons are useful.	Admin	14.7%	DOCUMENT
Interaction	Weak Learners Interaction	SS15	More in class activities and less homework.	Admin	11.8%	DOCUMENT
Interaction	Strong Instructor Interaction	SS16	I like the interaction with my tutor.	Admin	11.5%	DOCUMENT
Undecided	Undecided on Weakness	SS16	All good for me.	Admin	6.6%	DOCUMENT
Interaction	Strong Instructor Interaction	SS17	Me too (interaction with Tutor).	Admin	8.6%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS17	More team activities.	Admin	5.2%	DOCUMENT
Interaction	Strong Content Interaction	SS18	The poll activities. They can make you really think.	Admin	13.6%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS18	Longer class time for in class activities.	Admin	10.6%	DOCUMENT
Interaction	Strong Content Interaction	SS19	The reading and writing exercises that we go to do even if we're offline. They really help.	Admin	25.0%	DOCUMENT

Collaboration	Weak Teamwork or Group Work	SS19	More time for group work.	Admin	6.9%	DOCUMENT
Interaction	Strong Instructor Interaction	SS2	I agree, but I also like my teacher's feedback during online writing practices.	Admin	20.3%	DOCUMENT
Feedback Support	Strong Feedback Support	SS2	I agree, but I also like my teacher's feedback during online writing practices.	Admin	20.3%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS2	Yes, more time for teamwork.	Admin	8.7%	DOCUMENT
Feedback Support	Strong Feedback Support	SS20	Yes, that's true. I like them because they give me feedback for my answers.	Admin	20.0%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS20	Yes, we need to work together longer especially for writing tasks.	Admin	14.7%	DOCUMENT
Interaction	Strong Content Interaction	SS21	I like BBB (the platform), and the lessons are easy to use and very accessible.	Admin	21.4%	DOCUMENT
Undecided	Undecided on Weakness	SS21	Everything for me is good.	Admin	7.1%	DOCUMENT
Interaction	Strong Content Interaction	SS22	The lessons on Moodle are well organized and easy to navigate.	Admin	16.7%	DOCUMENT
Undecided	Undecided on Weakness	SS22	I agree. Nothing's to change.	Admin	9.1%	DOCUMENT
Interaction	Strong Content Interaction	SS23	I agree. I like everything- well-organized.	Admin	10.8%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS23	I think extra time to do our in-class activities	Admin	15.4%	DOCUMENT
Feedback Support	Strong Feedback Support	SS24	I like the online reading practices (feedback).	Admin	11.1%	DOCUMENT

Collaboration	Weak Teamwork or Group Work	SS24	Longer time to work in groups.	Admin	9.5%	DOCUMENT
Feedback Support	Strong Feedback Support	SS25	The writing practices are helpful (feedback).	Admin	8.3%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS25	Yes, so that we can interact more and get to know each other better (in groups).	Admin	22.2%	DOCUMENT
Interaction	Strong Instructor Interaction	SS26	I think it's the way how lessons are presented by the teacher.	Admin	16.9%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS26	I agree. Sometimes, we don't get the task done because we don't know each other.	Admin	22.1%	DOCUMENT
Interaction	Strong Learners Interaction	SS27	I like the class interactions.	Admin	7.8%	DOCUMENT
Undecided	Undecided on Weakness	SS27	I don't know, but I think everything is okay.	Admin	15.6%	DOCUMENT
Interaction	Strong Instructor Interaction	SS28	Me too. I like the interactive activities our teacher prepared for us.	Admin	17.9%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS28	More breakout room activities.	Admin	7.5%	DOCUMENT
Feedback Support	Strong Feedback Support	SS29	I think the online practices help a lot (feedback support).	Admin	14.3%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS29	Yes, that's true. We need more teamwork activities.	Admin	14.3%	DOCUMENT
Interaction	Strong Content Interaction	SS3	I don't know, but maybe the course is	Admin	23.0%	DOCUMENT

Collaboration	Weak Teamwork or Group Work	SS3	I wish there's longer time for interactive activities.	Admin	12.2%	DOCUMENT
Interaction	Strong Instructor Interaction	SS30	I like how the tutor interacts during online activities.	Admin	11.8%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS30	Yeah, I think longer time for group activities in the breakout rooms or in One Drive.	Admin	22.4%	DOCUMENT
Feedback Support	Strong Feedback Support	SS31	That's true, and also the feedback that I received from my teacher is helpful.	Admin	20.8%	DOCUMENT
Interaction	Strong Instructor Interaction	SS31	That's true, and also the feedback that I received from my teacher is helpful.	Admin	20.8%	DOCUMENT
Interaction	Weak Content Interaction	SS31	More Interactive games like Kahoot would be fun.	Admin	11.1%	DOCUMENT
Interaction	Strong Instructor Interaction	SS32	I agree, my teacher's presence makes the difference.	Admin	10.6%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS32	Some students do not cooperate during group work with limited time, so I guess we need more time for team activities to really get the work done.	Admin	31.8%	DOCUMENT
Interaction	Strong Content Interaction	SS33	Well organized lessons.	Admin	5.3%	DOCUMENT
Undecided	Undecided on Weakness	SS33	All good for me.	Admin	7.0%	DOCUMENT
Interaction	Strong Content Interaction	SS34	I like the activities during online class.	Admin	9.9%	DOCUMENT

Collaboration	Weak Teamwork or Group Work	SS34	think more group activities that we can share and learn from each other.	Admin	18.3%	DOCUMENT
Feedback Support	Strong Feedback Support	SS35	I like the practice activities that we can do on our own and receive feedback.	Admin	21.4%	DOCUMENT
Interaction	Strong Content Interaction	SS35	I like the practice activities that we can do on our own and receive feedback.	Admin	21.4%	DOCUMENT
Feedback Support	Weak Feedback Support	SS35	More feedback on writing activities.	Admin	7.1%	DOCUMENT
Interaction	Strong Content Interaction	SS4	Yeah, the lessons are well prepared and organized. Information on Moodle is easy to find.	Admin	22.1%	DOCUMENT
Undecided	Undecided on Weakness	SS4	All good.	Admin	2.9%	DOCUMENT
Interaction	Strong Content Interaction	SS5	That's right. The activities are challenging yet easy to do. They give you instant feedback.	Admin	23.2%	DOCUMENT
Feedback Support	Strong Feedback Support	SS5	That's right. The activities are challenging yet easy to do. They give you instant feedback.	Admin	23.2%	DOCUMENT
Undecided	Undecided on Weakness	SS5	I agree, everything's good.	Admin	7.2%	DOCUMENT
Interaction	Strong Content Interaction	SS6	I agree, but I like the interactive poll activities during online classes better.	Admin	19.1%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS6	More group or team works.	Admin	7.4%	DOCUMENT

Interaction	Strong Instructor Interaction	SS7	maybe because our teacher explains it well. That's what I like the most in this course.	Admin	23.3%	DOCUMENT
Undecided	Undecided on Weakness	SS7	I don't know. Everything is good.	Admin	9.6%	DOCUMENT
Interaction	Strong Instructor Interaction	SS8	Yeah, that's true. The tutor makes the poll activities more interesting and interactive.	Admin	19.2%	DOCUMENT
Interaction	Weak Content Interaction	SS8	More interactive activities to check if students understand the lessons.	Admin	13.7%	DOCUMENT
Interaction	Strong Instructor Interaction	SS9	I like the way how my teacher makes the online class more interactive.	Admin	18.6%	DOCUMENT
Collaboration	Weak Teamwork or Group Work	SS9	Longer time for group work especially writing.	Admin	10.0%	DOCUMENT

APPENDIX E

ANOVA Single Factor Data Set

Anova: Single Factor						
SUMMARY						
Groups	*Count*	*Sum*	*Average*	*Variance*		
Interaction Asynchronous	35	168	4.8	0.223529		
Interaction Synchronous	35	157	4.485714	0.727731		
Collaboration	35	125	3.571429	1.605042		
Feedback Support	35	135	3.857143	1.361345		
ANOVA						
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	33.33571	3	11.1119	11.34549	1.09E-06	2.671178
Within Groups	133.2	136	0.979412			
Total	166.5357	139				