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Perception of online learning among health sciences' students— A mixed methods study

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Abstract:

BACKGROUND: The outbreak of COVID-19 pandemic has led to a paradigm shift from the traditional classroom setting to online education and webinars. We could not identify any published multidisciplinary studies from Indian institutions that have explored the perception of online learning among health sciences students from different faculties. The study aimed to explore the perception of health sciences students regarding their experience, satisfaction, and challenges with online learning compared to offline learning.

MATERIALS AND METHODS: An explanatory sequential (QUAN–qual) mixed-methods study was conducted between November 2020 and June 2021 among 474 medical, nursing, physiotherapy, and dental students attending online classes. All the students were invited to participate in the study using Google Form questionnaire. Quantitative data was analyzed using MS Excel. For qualitative data, focused group interviews were conducted with a group of six to eight students from each discipline on an online platform for 45 min to 1 h and transcripts were thematically analyzed.

RESULTS: Totally 474 students responded to the survey questionnaire. Nearly 56.3% (267) of the students were not satisfied with the online learning program. Around 62.2% (294) of the students felt that online learning could not retain their interest. Students reported that learning the assigned syllabus was difficult during online lectures. They agreed that online learning could be distracting, time-consuming, and did not provide an adequate pace of learning.

CONCLUSION: Though online learning is an effective learning strategy, it needs to be further improved considering the valuable inputs given by students.

Keywords:

Focus groups, health sciences, online learning, surveys and questionnaires

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platforms has challenged the traditional classroom learning model.^[2]

Online education is indeed not a new concept. Before the COVID-19 pandemic, studies have considered the use of online delivery techniques for continuing education and acquiring skills through the blended learning approach.^[3,4] Previous research has also reported that students find online education a more flexible and less time-consuming way to learn from the comfort of their homes.^[5,6]

In the current COVID-19 scenario, online education became an imperative mode of

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learning and advocated as the educational pedagogy of the future. Since the pandemic, many studies have explored the perception of health sciences students toward online learning in their respective faculties.^[7-14] Few studies have included health sciences students' from different faculties,^[12,15-18] however, we could not identify any such published multidisciplinary studies from Indian institutions.

The teaching-learning process amongst health care fields such as medicine, dentistry, physiotherapy, nursing, and other allied departments is varied. It majorly involves learning clinical and practical skills in the clinics, wards, and laboratories.^[15] The sudden overriding of face-to-face classroom lectures, clinic, and laboratory-based learning by e-learning during these critical times of COVID-19 pandemic may have had affected the learning of health sciences students.

At the study sites, the researchers felt the need to explore the perceptions of medical, dental, physiotherapy, and nursing students regarding their experience and satisfaction with online learning and to investigate the facilitating factors and challenges in online learning. The study's findings may help the educators revise and plan their teaching-learning strategies more effectively.

Materials and Methods

Study design and setting

An explanatory sequential QUAN-qual mixed-methods study (cross-sectional survey and focus group discussion [FGD]) was conducted between November 2020 and June 2021 at Medical and Nursing colleges, All India Institute of Medical Sciences, Rishikesh, ESIC Dental College and Hospital, Delhi and D.Y. Patil School of Physiotherapy, Navi Mumbai.

Study participants and sampling technique

The study population included medical, nursing, physiotherapy, and dental students irrespective of the year of graduation. The total strength of the students in all the colleges from first to final year is 1480 students. All the students attending online classes who consented to participate and return the completed questionnaire were included. Minimal sample size was estimated as 306 with 95% confidence level and 5% margin of error. We decided to enrol at least hundred students from each of the four disciplines. Considering refusal for participation in the study, invites were sent to 150 students from each discipline.

Data collection tool and technique

An expert validated pilot-tested 36-item semi-structured questionnaire that included open and close-ended questions was sent via Google Forms (see Annexure 1).

According to Cronbach's alpha, the reliability coefficient was 0.726 showing that the internal consistency of the questionnaire was acceptably good.

The questionnaire consisted of two sections:

Part A: Consisted of 11-items to obtain baseline information regarding the sociodemographic profile of the health sciences students.

Part B: Consisted of a 25-item questionnaire to assess students' perception of online and traditional classroom learning. Responses were recorded using a four-point Likert scale (strongly agree – 4, agree – 3, disagree – 2 and strongly disagree 1). Participants were given a week to respond with one reminder in between.

Focus group discussion

Six to eight students were invited for FGDs from the respective 4 years of each discipline for 45 min to 1 h till data saturation. FGDs were conducted via Google Meet or MS Teams with the help of interview guide (Supplementary file). Moderator welcomed the participants, informed general rules and the purpose of discussion. The FGDs were recorded to facilitate transcription. The reporter also took notes during the discussion. In the end, the moderator summarized the discussion and reached a group consensus.

Institutional ethics committee approval

Ethical approval for the study was obtained from the Institutional ethics committee of all the three study sites; Medical and nursing colleges (Ref No. AIIMS/IEC/20/679), Dental college (Ref No. 20/11/2020/IEC DC) and physiotherapy college (Ref No. DYP/IEC-BH/132/2020). Before proceeding with the survey questionnaire and FGDs; permissions were obtained from the Dean (Academics)/principal of the institutes, participants were informed about the purpose of the study and written consent was obtained from the willing candidates.

Data analysis

Data from the Google Forms were extracted on spread sheet. The proportion was used to measure the level of satisfaction. For qualitative data, recorded interviews were transcribed and transcripts were made. MK conducted the primary analysis using content analysis.^[19] All authors further interpreted the transcripts. Researcher's pre understanding and experiences were bracketed to avoid personal bias. Meaningful units were identified, condensed, coded, and categorized. Finally, the main themes that emerged during the analysis were articulated. To ensure rigor of qualitative study, Guba and Lincoln's criteria

was used.^[20] Credibility was established by member check (discussion points were confirmed by participants) and method triangulation (quantitative study to complement qualitative findings). For dependability of data, all stages and processes of the study were recorded daily in detail. With regard to the transferability of findings, participant's comments were presented without alterations. Demographic characteristics of participants have been reported for further examination by readers.

Results

A total of 474 undergraduate students participated in the study. Of these, 104 (21.9%) were males and 370 (78.1%) were females. As for the disciplines, 104 (21.9%) were medical students, 118 (24.9%) were dental students, 142 (30%) were nursing students, and 110 (23.2%) were physiotherapy students. Majority of the students, 377 (79.5%), lived in urban areas, whereas only 97 (20.5%) lived in rural areas. Most of them used mobile phones to access online lectures, followed by laptops and tablets. Most of the students' utilized mobile internet facilities followed by Wi-Fi. These were self-funded by most of the students ($n = 454$). Of them, 379 (80%) of the study sample did not have any online learning experience before this pandemic [Table 1].

Students addressed the questionnaire through a Likert scale ranging from strongly agree to strongly disagree. Graph 1 mentions the overall experience of online learning. Majority of the students disagreed—especially regarding maintaining interest throughout the online class and were not satisfied with the learning outcomes.

Comparison of online learning with traditional classroom learning is represented in Graph 2. Majority of the students disagreed when asked if online learning is better and more interesting than traditional learning. Students even reported that learning the assigned syllabus was difficult during online lectures and agreed that online

learning can be distracting, time-consuming, and does not provide an adequate pace of learning compared to traditional learning. They even reported that clarity of information, interaction with teachers and classmates as well as participation during discussions are better in traditional learning. Cost-effective and economical, submission and timely feedback on assignments, and sense of responsibility toward oneself were the few perks of online learning reported by students. Majority of the students disagreed with the overall satisfaction through online learning.

Around 360 (76%) of the students agreed that they faced technical difficulties during an online session as represented in graph 3

Focus group interview

Six FGDs were conducted among 48 students to gain in-depth experience about online learning. FGD was framed given understanding the strengths and weaknesses of online learning and future recommendations for faculties and students [Table 2]. Quotes from the respondents within each category are presented to illustrate the findings.

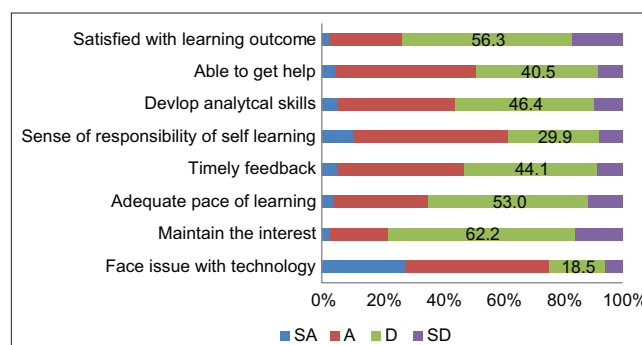
Advantages of online learning

Two students thought that online lectures are more organized as they quoted "Online clinical posting was more organized. Offline it used to be according to the patient availability. Sometimes we being told to take the case but could not discuss much. Classes were very haphazard depending on teacher availability" (FGD 1). Students thought that they could revisit the PowerPoint's shared and revise it. The main advantages that students felt in online learning were: it was more comfortable as there was a flexible schedule, no traveling was involved, and it provided the security of not getting COVID.

"Offline lectures get very exhausted after 2 hours we don't have energy to listen. We just are physically present. I feel saturated at the end of day. Online is more comfort. At the end we have to read all by ourselves." (FGD 3)

Table 1: Demographic details of the participants

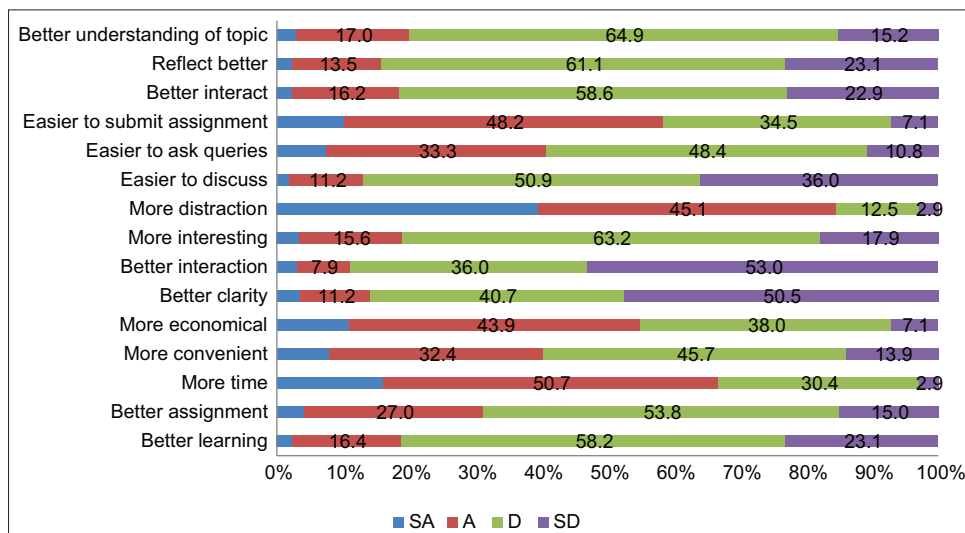
Demographic variables	Mean±SD	n (%)
Age	20.87±1.64	
Gender		
Female		370 (78.1%)
Male		104 (21.9%)
Year of study		
First year		161 (34%)
Second year		75 (15.8%)
Third year		172 (36.3%)
Final year		66 (13.9%)
Last year academic score	70.79±10.57	
Habitat		
Urban area		377 (79.5%)
Rural area		97 (20.5%)



Graph1: Experience with online learning

Table 2: Students' perception of online classes

Theme	Advantages of online learning	Disadvantages of online learning	Suggestions for faculty	Suggestions for students
Codes	More organized	Learning depend on self-motivation, honesty	Technical team to support	Take responsibility for learning
	Revisit the lecture	Lecture gets extended and exhaustive	Face-to-face interaction online	Keep scheduled routine
	Comfortable	Teacher cannot observe cues of student	Rather than mode presentation style matters	Proper posture and place without distraction
	Security of not getting infected	Comfortability hindering learning	Scheduled timetable	Dedicated phone for online classes
		Lot of distraction at home	Group assignments to enforce thinking, teamwork, and interaction	Prior preparation necessary for online classes
		Understandability and retention less in online		
		Losing good study habits		
		Health issues		
		Cumbersome for teacher to make class interesting		
		Issues with internet connectivity		
		No interactivity and sense of connectedness		



Graph 2: Online learning versus traditional classroom learning

"I feel that the major advantage that we got was that the traveling time was very much reduced like there was no traveling time and the energy was also saved for traveling that we used to spend to go to college daily and then we had lecture." (FGD 7)

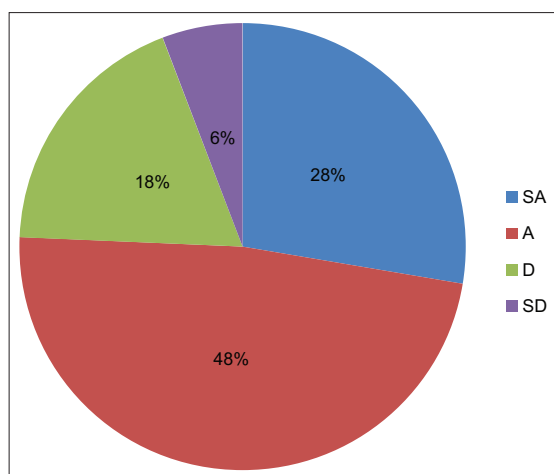
"I feel secured that I don't have to meet a lot of friends. I don't have to worry about COVID infection. I know I am safe in my room." (FGD 4)

Disadvantages of online learning

Students believed that online learning mainly depended upon self-motivation and honesty. "Honesty is very important because it happens that after login we are roaming outside, not listening anything then it's not useful" (FGD 2). They felt this as a limitation as many

students lack discipline. "We could not study with that discipline as we know we have taken the screenshot so we can study it later on but in the physical class we know that we have to note down all the points then and there and there used to be interactions in form of bases with a teacher that I missed" (FGD 5). Motivation to learn has decreased during online classes. "During offline classes, I was more motivated for studying. I used to meet my class fellows daily. I used to meet my teachers personally daily. So I used to be more motivated to study in groups and answer better. Motivation levels are decreased" (FGD 6).

Lectures extended beyond 1 h and there is no specific timing of lectures throughout the day. During online sessions, the teacher cannot observe the cues of students.



Graph 3: Issues faced with technology

“We are trying to understand, during face to face interaction the teacher can understand that we are not getting the points. But in online that is not possible and it’s difficult for us to tell teacher that we have not understood”(FGD 6). Students also felt that too much comfortability is hindering the learning process. “In online classes in name of comfort, we just sleep during class and there is no one to wake us up. But in offline teacher pays attention if someone is drowsy”(FGD 2). As there was no compulsion to attend the classes, many things were just overheard. Students felt that the learning atmosphere at home was not good due to many distractions like checking WhatsApp messages in between classes. Thus, even if they try to concentrate it was not possible. “When we are among a lot of people at some place like college or school there’s a lot of things that makes things comfortable for us to accommodate with each other and like with teacher. We not get that sincerity”(FGD 2).

Understandability and retention was a problem with online classes especially for clinical postings. “Though the posting was well organized, the flow was good compared to traditional posting but I could not understand much in clinical cases” (FGD 5). Students opined that though the theoretical part was clear, they could not understand the applicability. It is too cumbersome for the teacher to make the topic understandable and interesting due to the limited technical ability of the teacher. “Our teachers are also too new in this, they could not understand the technology of how to use certain apps or certain tools” (FGD 4). Teachers writing on blackboard or whiteboard in offline classes improved their understanding.

Student quoted, “Teachers have to prepare a lot of presentations, search videos with correct information which creates a lot of problems for teachers also, and then they have to maintain the proper connection and

each and every technical thing on their own. So it takes a lot of time for them also.” (FGD 4)

Students agreed that they were losing good study habits, such as note-taking. Some students also started having health issues like headaches, backache, irritability, etc., Many students and teachers were struggling with poor network connectivity that led to cancelation of lectures and voice breakdown in-between classes. Students said that whatever effort the teacher made to maintain interactivity was never the same as in offline classes. “I think there is a need of eye contact between student and teacher which brings more clarity in the topic and sometimes communication is more important which is break due to online classes”(FGD 5). Students were not feeling connected to their fellows and teachers. “We don’t even know our third year teachers personally. They don’t know anything about us, except for our names.” (FGD 3) “In online lectures ma’am we have just seen our friends in a like list sort out that they are attending the class only we cannot interact with them directly.” Students also felt that cases were so hypothetical that they could not connect with the patient. We don’t get to touch the patient. Just seeing the patient and X-rays is not sufficient for me.”(FGD 6)

Suggestions for faculty

Due to technical issues faced by the teachers, students suggested there should be a supporting technical team. Faculty should ask students to switch on cameras to make face-to-face contact. Rather than reading the slides, teachers should use other interactive teaching tools, share their experiences and use problem-based learning.

“Slide reading is boring. Some teachers are more presentable; they share their experiences and clinical cases. I think rather than the mode of teaching its presentation matters. It should be problem-based so that we understand the same in relevance. It applies to both online and offline” (FGD 7). Session must be scheduled with appropriate gap in between lectures. Teachers can give assignments to enforce thinking with brainstorming sessions in small groups, which will improve teamwork. Breakout rooms of Zoom were found to be very interesting by students. “Classes can meet in small batches and then when they meet it should be discussion and interaction with each other or patient, brainstorming session only” (FGD 4).

Suggestions for students

After experiencing the online classes, students felt that they themselves should take responsibility for learning and keep their schedule considering the unavoidable circumstances. “They should make it a habit to wake up on time and to do their morning rituals at time and then attend the online classes with

the same punctuality, with same concentration levels as they are doing in offline classes. And this could only help them study better" (FGD 3). Students should find a place without any distraction, for which one of them suggested keeping a dedicated mobile for learning without any other applications and closing all notifications. Students should sit properly on a chair as in offline classes. They should go through the topic once before the class to improve their understanding and clear their doubts.

Discussion

The present study aimed to explore the perception of health sciences students from varied disciplines regarding their learning experience and satisfaction with online learning. This multi-center study being a mixed-methods design was able to explore and gain an in-depth insight into the online learning experience of students.

Perception of online learning

Overall, most of the students (56.3%) were dissatisfied and negatively perceived the online learning program and its outcomes. Students felt that they could not retain interest throughout the class (62.2%). Several studies in the literature have reported similar results.^[8,10,15,21]

Students were not satisfied with the pace of learning (53%) even though online materials allow students to study at their own pace. This finding contradicts the findings of the studies by Dost *et al.*^[8] and Karaman.^[3] In our study, this may be due to faculty's lack of adherence to timetable as classes were conducted as per flexibility.

Studies have reported that faculty–student interactions such as resolving queries or answering questions, feedback on performance, and technical support are pertinent to engaging students during online learning.^[22,23] When questioned regarding getting help from the faculty for questions/queries arising during online classes and in obtaining timely feedback for assignments, students in the present study gave neutral responses. They reported online learning to be comparable with traditional learning. Students also agreed that online learning facilitated and made submission of assignments easier. However, the ease of asking queries/questions and participating in discussions was perceived negatively by students.

Generally, students and faculty have reported a preference for face-to-face learning concerning communication and feedback.^[24,25] It has been reported that immediate feedback from faculty is lacking in online learning, which is extremely essential when complex practical competencies are taught.^[26]

Students in our study reported that online learning was challenging but at the same time encouraging in the sense that it required them to be responsible and accountable for their learning. Also, online learning was perceived as a cost-effective, economical mode of learning by the students as the daily commuting expenses were saved. A study on distance education in Nursing preferred online delivery techniques due to its cost-effectiveness.^[27] Similarly, study by Dost *et al.*^[8] found online learning as a cost-saving method of learning.

Nearly 50% of the students in the present study agreed that online teaching provided multiple opportunities to develop analytical skills of related topics. A study conducted in the past showed no significant difference between face-to-face and online learners for critical thinking skills.^[28]

The majority of the study students (>75%) faced technical issues and challenges, such as loss of internet connectivity/poor connection, with online learning. Similar results have been reported in the literature.^[8,9,15,17,29,30]

Online learning versus traditional face-to-face classroom learning

Participants in our study disagreed when asked if online learning was better (80.1%) and more interesting (81.1%) than traditional classroom learning. Similar result was reported by Abbasi where 85% of the students negatively responded when asked whether "E-teaching is better than traditional learning".^[15] Physical presence of the teachers and the gestures eye contact made by them while teaching stimulates interest in learning.

Students agreed that online classes are more distracting and time-consuming when compared with traditional classroom learning. In the study by Dost *et al.*,^[8] students stated family distractions and timing of tutorials as barriers in online learning.

Degree of interaction with fellow classmates and teachers was perceived negatively by students in online learning. Similar results have been reported in the studies conducted by Ansar and Abbasi on perception of students regarding online learning during the COVID pandemic.^[10,15]

Students reported that traditional assignments were better than online assignments, and learning the assigned syllabus was difficult with online classes. They even reported that clarity of information and reflection on one's own learning and progress was better in traditional learning. This agrees with the results reported in the study by Ansar *et al.*,^[10] where one of the student-perceived barriers toward online learning was difficulty monitoring their academic progress.

Overall, students disagreed when questioned if online learning was better than traditional face-to-face classroom learning and facilitated a good understanding of topics. Students preferred traditional face-to-face classroom learning and badly missed it. Literature review highlights similar results by other studies.^[10,15]

Advantages and disadvantages of online learning

The main advantages of online learning identified in the present study are that it is more organized; time and money are saved due to lack of the travel, ability to revisit the lectures, comfort and flexibility, and the security of not getting infected by the Coronavirus. Similar advantages of online learning have been put forth in several published studies.^[5,6,8,10,31,32]

The barriers to online learning identified through FGDs include extended lecture hours, the inability of teachers to observe students' cues, learning hindered due to comfort and non-adherence to an appropriate time schedule, difficulty in understanding topics and their clinical application, poor internet connectivity, family distractions, loss of good study habits, lack of interaction with teachers and classmates and adverse effects on health. This has affected students' overall pace of learning. These findings overlap with other studies that have explored students' perceptions, barriers and enablers for online learning. In a study by Dost *et al.*,^[8] family distractions (26.76%), internet connection (21.53%), the timing of tutorials (17.31%) were reported as some of the barriers to effective online learning. Attardi and Rogers also identified poor internet connection as a deterrent to online learning.^[33] Poor communication in online learning was highlighted in a study by Dyrbye L.^[34] Several studies have reported poor motivation, increased anxiety, lack of self-discipline and poor interaction between teachers and learners as major disablers for online learning.^[35-40] However, contrary to the results of our study where students reported online learning as time and cost-saving, studies by Hammarlund *et al.*^[38] and Ikram *et al.*^[39] highlighted the concern of continuing costs associated with online learning.

Overall, questionnaires and FGDs in the present study facilitated comprehensively exploring the health sciences' students' perception of online learning. However, the mirroring concern is that online teaching has compromised the clinical competency and confidence of the health sciences' students and may provide a notion of not being prepared for their profession.

Limitation and recommendation

The main strength of the present study is that, to our knowledge, it is the only Indian multi-center study that has explored and found valuable insights into the online learning experience of health sciences' students

when compared with traditional classroom learning. Using a mixed-methods study design enabled a deeper understanding of participants' perceptions and helped us explore students' opinions to optimize their learning experience. The present study did not examine perceptions of the faculty; future studies can be planned in this direction to gain an in-depth understanding of e-learning programs by including both the student and faculty perspective.

Conclusion

Although online learning has its advantages of being more organized, time and money saving, provides ability to revisit lectures, comfort, flexibility and security of not being infected by coronavirus, several challenges and difficulties have been reported by the students in the present study when compared with the traditional classroom learning. The study also helped us to identify the strengths and flaws of online learning thereby enabling us to enhance learners' experience at our institutes in the present COVID 19 pandemic situation and years to come. Moreover, the findings of this study can be considered in curriculum design for online sessions (learning) and for students' professional growth/development.

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Conflicts of interest

There are no conflicts of interest.

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Supplementary file

Focus Group Interview Schedule

1.	Share about the online classes/ courses you have attended?
2.	What do you think are the strengths of online learning?
3.	What do you think are the weaknesses of online learning?
4.	I would like you to think about those strengths and weaknesses...and then think about face-to-face traditional classroom teaching you have attended. What do you miss about face-to-
5.	What do you miss about an online course when you are in a face-to-face course?
6.	Can you talk about your sense of connections with others in a face-to-face course versus an online course? (Classmates, Teachers etc.)
7.	You have experience with taking classes online. What suggestions would you give to a student who is attending an online class for the first time?
8.	What suggestions would you give to faculty taking online classes?