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Student and faculty perceptions of effectiveness of online teaching modalities

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ABSTRACT

Background: When the COVID-19 pandemic forced colleges and universities to rapidly transition from face-to-face teaching to online teaching/learning environments, different instructional methods were employed to deliver course content and help students remain engaged in learning. With the transition back to the on-campus environment, select online teaching modalities may be effective in the face-to-face environment as well. While online and distance learning have been extensively studied, little research is available to guide faculty in using technologies designed for distance learning in the face-to-face environment.

Purpose: The purpose of this study was to determine pre-licensure baccalaureate nursing student and nursing faculty perceptions of the effectiveness of various online teaching modalities.

Method: A mixed-methods study using a convenience sample of students and faculty at two universities was conducted. Students and faculty completed a researcher-developed survey to rate a variety of online teaching methods and technologies from a scale of one (not effective at all) through six (extremely effective). Participants also provided comments within the survey and in focus groups of randomly selected students and faculty. Surveyed items included modes of asynchronous and synchronous instruction, instructional technology, and instructional activities.

Results: There were significant differences as well as similarities in student and faculty perceptions of effectiveness. Students demonstrated a clear preference for pre-recorded lectures, while faculty perceived synchronous lectures and assigned readings to be equally as effective as pre-recorded lectures. Synchronous activities such as case studies and student presentations were rated as more effective by faculty than by students. Both groups perceived instructional games, especially quiz games, as very or extremely effective.

Conclusions: Students were more engaged with instructional activities that they perceived as effective for learning. The results of this study will assist faculty in developing effective online and in-person instruction which will optimize the teaching/learning experience.

1. Student and faculty perceptions of effectiveness of online teaching modalities

With the onset of the COVID-19 pandemic in the spring semester of 2020, colleges and universities across the globe were forced to make rapid changes in methods of delivery of educational content. The need for rapid change due to the pandemic highlighted the necessity for educational institutions to have emergency plans in place to prevent disruptions to educational delivery (Ferri et al., 2020). When planning for alternate methods of course delivery, it is imperative to select those that support continued progression and academic success for students. Individual student characteristics, including socioeconomic factors and skill with technology, have an effect on success with online or blended education (Ferri et al., 2020; Francis et al., 2019). A student's perception of a teaching modality influences willingness to engage with the product, and thus influences the effectiveness of the teaching strategy (Maskun et al., 2020).

Midway through the Spring 2020 semester, the onset of the COVID-19 pandemic forced a shift from on-campus face-to-face education to online course delivery, with no time to consider student or faculty

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characteristics or access to and skill with technology. In the Fall of 2020
investigators at two schools of nursing in the southern United States
sought to discover student and faculty perceptions of the effectiveness of
the online teaching strategies used. One participating university adopted
a strategy combining asynchronous recorded lectures with synchronous
online class time, while the other participating university delivered
courses with some students attending face-to-face while others attended
synchronously online, alternating each week. With effective measures in
place to prevent the spread of COVID-19, classes at both universities
resumed face-to-face classes in the Fall of 2021 in either a fully onsite or
hybrid environment.

Understanding student and faculty perceptions of the effectiveness of
various online teaching modalities may provide useful information in
designing courses to meet students' needs with the return to traditional
on-campus classes, as well as equip educators with necessary information
to plan for a rapid change to online learning should a future need arise.
The purpose of this study was to determine student and faculty
perceptions of the effectiveness of various online teaching modalities,
and to determine which modalities may be useful in improving the
educational experiences of students in the traditional classroom setting.

2. Review of the literature

With the closure of face-to-face classrooms during the COVID-19
pandemic, faculty and students were forced to rapidly shift from face-
to-face instruction to an online format. A review of the literature
revealed common barriers and facilitators to online teaching and
learning. Christianson et al. (2002) found that while faculty spent
significantly more time preparing for and implementing online courses,
they described online education as effective, interactive, and collabora-
tive, especially when employing activities to foster collaboration as
well as independent learning. Kim et al. (2022) studied academic success
of online nursing courses during the COVID-19 pandemic and found that
self-directed learning and engagement in the online course were pre-
dictors of success; obstacles to learning included insufficient technical
skills, internet connectivity, and anxiety about the online format. A
meta-analysis of studies on online learning effectiveness (Prestiadi et al.,
2020) identified factors affecting the effectiveness and quality of online
learning, including the skill and knowledge of teachers in developing
and using online materials and tools, internet network support, and
student behavior in the online course. The meta-analysis identified ease
of understanding material and interaction with teachers as advantages
to face-to-face learning, and flexibility with learning time and assign-
ment submission as advantages to online courses. Another study of
nursing student perceptions of online learning during the pandemic
identified five challenges to online learning: lack of motivation, missed
learning opportunities, decreased interaction between students and
teachers, and differences between online tutorials and face-to-face
learning (Siah et al., 2022). Maskun et al. (2020) described students'
positive perception of online learning, citing flexibility, ease of use of
technology, and higher motivation to learn. A study by Domina et al.
(2021) demonstrated a link between availability of technology and
student engagement, and that multiple modes of communication, such as
apps, social media, email, and virtual meeting platforms, increased
student engagement in courses. Similarly, Ali (2020) found that staff
readiness and confidence, availability of resources, student accessibility,
and student motivation are key to successful online learning. Butnaru
et al. (2021) identified factors that increased students' perceptions of the
effectiveness of online learning, including access to a computer or mo-
bile device, internet access, familiarity with online communication and
computer skills, leniency of faculty, and the faculty's ability to manage
online courses.

Course format and teaching/learning methods had a significant role
in student and faculty satisfaction with online learning. Peslak et al.
(2021) studied the effectiveness of educational delivery modes and
found that courses offered face-to-face with an online supplement were
perceived as most effective, followed by classes offered in the hybrid
format. Students perceived courses offered fully online to be least
effective. These perceptions were consistent over a 4-year period
beginning before the onset of the COVID-19 pandemic. Muthuprasad
et al. (2021) studied students' perceptions and preferences for online
during the COVID-19 pandemic. The study showed that pre-
recorded online lectures were the format most preferred by students,
followed by live online courses that could be recorded. Students
perceived classes that relied heavily on reading materials to be less
effective but had a positive view of video recorded lectures with sup-
plemental reading material. Communication with faculty played a role
in perceived effectiveness; students preferred to post questions on a
learning platform, followed by live chat or email to instructors. Participants
indicated that online learning improved students' technical skills
but had a negative effect on communication with instructors. Hampton
et al. (2017) studied online nursing students' preferences for teaching/-
learning methods among students enrolled in Registered Nurse-
to-Bachelor of Science in Nursing (RN-to-BSN), Master of Science in
Nursing (MSN), and Doctor of Nursing Practice (DNP) courses; the
preferred methods were narrated PowerPoint presentations and videos,
followed by synchronous sessions via Adobe Connect. PowerPoint pre-
sentations and case studies were reported as most effective and
engaging, with collaborative group projects least preferred. The study
found generational differences in preference with Baby Boomers and
Generation X students preferring discussion boards and Millennial stu-
dents preferring simulation and online games. Almendingen et al.
(2021) assert that during the pandemic, online teaching was delivered
by teachers skilled in face-to-face education with little experience in
online education, who attempted to employ the same teaching methods
used in the traditional classroom. Activities identified by the students
as helpful in online learning included pre-recorded lectures, student
response activities such as Kahoots, and small group digital activities,
preferring self-selected groups to random group assignment.

The same study by Almendingen et al. (2021) demonstrated students
had lower expectations for achievement of learning outcomes of online
learning during the COVID-19 pandemic, but the study did not assess
actual learning outcomes of study participants. Vuttannon et al. (2022)
studied learning outcomes of nursing students during the COVID-19
pandemic and found no significant difference in learning outcomes;
students assigned lower course evaluation scores to online courses, but
faculty expressed high satisfaction with online teaching and learning.
Ferri et al. (2020) purport that the need for remote teaching during
the COVID-19 pandemic opened new opportunities for educational in-
stitutions. There is a need to develop new methodologies and peda-
gogical approaches and to develop technology specifically designed for
online teaching and learning. The authors state that this will require an
interdisciplinary and holistic approach, and gaps in availability and
competence with technology and sociological challenges of affordability
must be addressed.

3. Methods

This mixed-methods study sought to determine what online teaching
modalities used in two nursing schools during the COVID-19 pandemic
were perceived as most effective by students and faculty. After IRB
approval was deemed exempt, clinical students from two publicly fund-
ded universities in the southern United States were recruited via con-
vienience sampling by announcement notification through the schools'learning management systems. Nursing faculty from both universities
were recruited to participate via email. The invitation provided a
weblink for direct access to participate in survey completion. The survey
was developed by the researchers to elicit both quantitative and quali-
tative data on perceptions of the effectiveness of various online teaching
modalities and included a total of 60 questions, 55 five-point Likert scale
questions assessing instruction modalities, learning platforms utilized,
and instructional activities employed; three yes/no questions regarding
difficulty in maintaining attendance; one question for students to ascertain year of study and one question for faculty to determine year of instruction. The Qualtrics survey platform was utilized for data collection. In addition, a random sample of students and a convenience sample of faculty were invited to participate in focus groups to discuss teaching modalities used in various courses. A random sample of students was recruited by sending an email invitation to participate to every third student on an alphabetized list. Due to the low number of faculty participants, all faculty teaching in the studied courses were invited to participate in the focus group. Separate focus groups were conducted with students at each level of courses and at each university. Separate faculty focus groups were conducted at each university. Focus groups were held via the Zoom virtual meeting platform utilizing open-ended questions pertaining to perceptions of online instruction. A total of 103 undergraduate students and 40 faculty members completed the surveys, while 11 students and seven faculty members participated in the focus groups.

Statistical analysis of the data was performed to determine student perceptions of effectiveness of each teaching modality surveyed. Data from the surveys was analyzed using Intellectus®, a statistical software program. Cronbach alpha (Table 1) was calculated with a 0.91 coefficient using 95% confidence interval, indicating excellent reliability. Remarks from the open-ended questions on the surveys providing qualitative data were analyzed for themes using Quirkos®, a qualitative data analysis software. Quirkos was also used to analyze the transcripts from the focus groups to identify themes which had emerged from these discussions. Grounded theory content analysis was used by two of the investigators who independently analyzed the student and faculty responses to the focus group questions and the open response questions in the survey. Inductive method of data analysis including constant comparison to identify words, phrases, or experiences leading to the emergence of common themes was conducted independently by each investigator. Investigators then met to review and audit findings. Investigator triangulation was used to reduce idiosyncratic bias. Method triangulation included focus groups and open response questions in the survey. Analysis revealed themes related to student and faculty responses.

4. Results

4.1. Quantitative data

As shown in Table 2, the majority of the students (n = 104) completing the survey were junior (58.25%) and senior (40.38%) level students. Most students did not have trouble accessing a computer (96.12%, N = 99) or difficulty accessing the internet (87.38%, N = 90), 3.88% (N = 4) of students had difficulty accessing a computer, and 12.62% (N = 13) of students had trouble accessing the internet during the Fall 2020 and Spring 2021 semesters. In contrast, faculty (N = 14) had no difficulty accessing a computer or finding a quiet place to work and only one faculty member had difficulty accessing the internet (7.14%). 7.64% (N = 81) had no trouble finding a quiet place to attend class, 21.36% (N = 22) did have difficulty finding a quiet place to attend class online during the same semesters.

4.1.1. Asynchronous teaching

Asynchronous methods of instruction consisted of methodologies that students could complete on their own time and at their own pace (Table 3). Students felt pre-recorded lectures (74.04%, N = 77) and audiovisual media (52.88%, N = 55) were extremely effective. Faculty felt that pre-recorded lectures (46.15%, N = 6), and audiovisual media (38.46%, N = 5) were both moderately effective. VoiceThread® was perceived as being an extremely effective method of providing lecture recordings by both students (82.69%, N = 86) and faculty (61.54%, N = 8). Panopto® was perceived as extremely effective by both students (46.15%, N = 48) and very effective by faculty (76.92%, N = 10). Assessment Technologies Institute® (ATI) modules were used by both schools; faculty (61.54%, N = 8) perceived these modules as being moderately effective, but students (43.27%, N = 45) felt the modules were not very effective at all.

4.1.2. Online meeting technology

Synchronous methods of instruction consisted of methodologies in which students and faculty engaged at the same time but remotely (Table 4). Zoom® was perceived as extremely effective by both students (42.31%, N = 44) and faculty (69.53%, N = 9) and Microsoft Teams® as slightly effective by students (32.69%, N = 34) and extremely effective by faculty (69.23%, N = 9).

4.1.3. Instructional technology

Instructional games (Table 5) such as Jeopardy (31.73%, N = 33), Kahoots (50.96%, N = 53) and Cram (63.46%, N = 66) are all perceived as extremely effective by students. Faculty perceived Jeopardy (76.92%, N = 10) and Cram (63.46%, N = 66) as very effective. Kahoots (53.85%, N = 7) was perceived as extremely effective by faculty. Catchphrase (100%, N = 13) was perceived as very effective by faculty, but only slightly effective by students (61.54%, N = 64).

Case studies, a common instructional activity even before COVID-19, were perceived as very effective by faculty (61.54%, N = 8), but students identified them as being only moderately (31.73%, N = 33) to slightly effective (28.85%, N = 30). For online group work, Zoom Breakout Rooms (30.77%, N = 32) were moderately effective according to the students, but very effective by faculty (Zoom 69.23%, N = 9). Students perceived TedTalks as extremely effective (28.85%, N = 30), but faculty felt it was only moderately effective (84.62%, N = 11).

4.2. Qualitative data

4.2.1. Student results

The researchers explored the perceptions of faculty and students on teaching modalities used during the pandemic by asking separate focus groups questions regarding synchronous and asynchronous content delivery, learning activities, and activities that should remain when traditional in-person instruction resumed. From the student replies, four

| Table 2 | Demographics. |
|---------|---------------|
| Students N = 104 | Faculty N = 14 |
| Class | N | % | Class | N | % |
| Sophomore | 1 | 0.97 | Sophomore | 2 | 14.29 |
| Junior | 60 | 58.25 | Junior | 8 | 57.14 |
| Senior | 42 | 40.38 | Senior | 4 | 28.57 |
| No answer | 1 | 0.97 | No answer | 0 | 0 |

Note. The lower and upper bounds of Cronbach’s α were calculated using a 95% confidence interval.
themes emerged: convenience, flexibility, isolation, and fear with re-entry.

4.2.1.1. Convenience. Students overwhelmingly appreciated the convenience of learning from home. Some felt the time they gained by not commuting to campus was beneficial as they were able to use this time for studying, which contributed to decreasing their overall stress. Recorded lectures allowed the students to “access them at any time,” “whenever I needed them,” and “could watch them in the comfort of my own home.” One student said that online learning allowed them to have more autonomy in their education and freedom to learn with methods that best suit them. By being able to study at their convenience, they put more effort into understanding the lectures and could immediately look up information in the book before moving on to other content. Another student said that “Testing at home and being able to rewatch lectures has been a saving grace in classes. The classroom setting is good for testing but being able to take it at home while proctored takes away any outside factors or distractions in the classroom and it seems less stressful.” Lastly, a student summed up the theme by noting, “Online access is of so much more convenience, comfort, less time consuming, and awesome—cannot stress enough.”

4.2.1.2. Flexibility. Similar to convenience, pre-recorded lectures allowed students to study at their own pace and at their chosen time of day. The majority also liked the flexibility to stop and start the recorded lecture, enabling them to re-listen to the recording as often as they felt necessary to understand the content, especially for the more difficult lecture, enabling them to re-listen to the recording as often as they felt necessary to understand the content, especially for the more difficult

Table 3
Asynchronous teaching.

|                          | Extremely effective | Very effective | Moderately effective | Slightly effective | Not effective at all |
|--------------------------|--------------------|---------------|----------------------|--------------------|---------------------|
|                          | %                  | %             | %                    | %                  | %                   |
| **Student Pre-Recorded Lectures** | 74.04 77          | 12.5 13       | 9.62 10              | 3.85 4             |
| **Faculty Pre-Recorded Lectures** | 23.08 3           | 30.77 4       | 46.15 6              |                    |
| **Student Audiovisual Media** | 52.88 55          | 16.35 17      | 25.96 27             | 4.81 5             |
| **Faculty Audiovisual Media** | 15.38 2           | 38.46 5       | 30.77 4              | 15.38 2            |
| **Student Panopto**       | 46.15 48          | 20.19 21      | 21.15 22             | 10.58 11           |
| **Faculty Panopto**       | 15.38 2           | 76.92 10      | 7.69 1               |                    |
| **Student VoiceThread**   | 82.69 86          | 6.73 7        | 9.62 10              | 0.96 1             |
| **Faculty VoiceThread**   | 61.54 8           | 15.38 2       | 23.08 3              |                    |
| **Student ATI Tools**     | 4.81 5            | 21.15 22      | 10.58 11             | 20.19 21           |
| **Faculty ATI Tools**     | 7.69 1            | 23.08 3       | 61.54 8              | 7.69 1             |

Note: 6 = Extremely Effective, 5 = Very Effective, 4 = Moderately Effective, 3 = Slightly Effective, 1 = Not Effective At All.

Table 4
Online meeting technology.

|                          | Extremely effective | Very effective | Moderately effective | Slightly effective | Not effective at all |
|--------------------------|--------------------|---------------|----------------------|--------------------|---------------------|
|                          | %                  | %             | %                    | %                  | %                   |
| **Student Zoom**         | 42.31 44          | 36.54 38      | 11.54 12             | 5.77 6             |
| **Faculty Zoom**         | 69.53 9           | 23.08 3       | 23.08 24             | 32.69 34           |
| **Student Teams**        | 6.73 7            | 15.38 16      | 23.08 24             | 7.69 1             |
| **Faculty Teams**        | 69.23 9           | 23.08 3       | 7.69 1               |                    |

Note: 6 = Extremely Effective, 5 = Very Effective, 4 = Moderately Effective, 3 = Slightly Effective, 1 = Not Effective At All.

Table 5
Instructional technology.

|                          | Extremely effective | Very effective | Moderately effective | Slightly effective | Not effective at all |
|--------------------------|--------------------|---------------|----------------------|--------------------|---------------------|
|                          | %                  | %             | %                    | %                  | %                   |
| **Student Jeopardy**     | 31.73 33          | 26.82 28      | 30.77 32             | 3.85 4             |
| **Faculty Jeopardy**     | 76.92 10          | 15.38 2       | 7.69 1               |                    |
| **Student Kahoots**      | 50.96 53          | 28.85 30      | 10.58 11             | 7.69 8             |
| **Faculty Kahoots**      | 53.85 7           | 30.77 4       | 7.69 1               |                    |
| **Student CRAM**         | 63.46 66          | 36.54 38      | 100 10               |                    |
| **Faculty CRAM**         | 100 13            | 23.08 24      | 61.54 64             |                    |
| **Student Catchphrase**  | 15.38 16          | 23.08 24      | 61.54 64             |                    |
| **Faculty Catchphrase**  | 100 13            | 23.08 24      | 61.54 64             |                    |
| **Student Case Studies** | 14.42 15          | 22.12 23      | 31.73 33             | 28.85 30           |
| **Faculty Case Studies** | 61.54 8           | 23.08 3       | 15.38 2              |                    |
| **Student Zoom Breakout Rooms** | 4.81 5 | 18.27 19      | 30.77 32             | 25 26              |
| **Faculty Zoom Breakout Rooms** | 15.38 2 | 69.23 9      | 15.38 2              | 21.15 22          |
| **Student Team Channels** | 3.85 4           | 5.77 6        | 30.77 32             | 34.62 36           |
| **Faculty Team Channels** | 23.08 3           | 76.92 10      | 3.85 4               |                    |
| **Student TedTalks**     | 28.85 30          | 19.23 20      | 9.62 10              | 38.46 40           |
| **Faculty TedTalks**     | 15.38 2           | 84.62 11      | 3.85 4               |                    |

Note: 6 = Extremely Effective, 5 = Very Effective, 4 = Moderately Effective, 3 = Slightly Effective, 1 = Not Effective At All.
rather than [in] the morning.’” Being able to proceed at one’s own pace and relisten to the pre-recorded lectures was the most often repeated statement from the students.

4.2.2. Faculty results

When asked about online learning, some students expressed the isolation they felt by not meeting in-person. Students were very direct with their feelings related to the absence of human interaction as evidenced by the following comments: “I really miss the human interaction,” and “No human interaction just, it gets old.” Several students stated that they “missed being with their classmates” and another said, “You need people in nursing school.” Having the cameras on during synchronous instruction was also important to several students reflected in comments such as, “I wish everybody turned their cameras on in Zoom®, I like to look at people.” Also, “It gives you more connection I think, to people when you can see their faces.” One student noted the psychological impact of online learning by stating, “Mentally it’s been hard staying at home.” These statements suggest negative psychosocial outcomes of online learning due to being separated from peers and instructors.

4.2.1.3. Isolating.

An unexpected theme unrelated to the focus group questionnaire also emerged. Students voiced a certain level of fear with going back to class in-person when the pandemic was over. Many of these students had only virtual classes since starting their nursing program and became accustomed to having recorded lectures at their disposal. The thought of returning to face-to-face lectures evoked comments such as, “It’s kind of scary having to flip the way that we’ve been learning for two semesters now,” and “I think about 99% of our class is freaking out right now because everyone’s worried we aren’t going to perform as well.” Another student voiced a similar concern:

“I am very anxious and very unsure on how my next semester will go if we do in fact go back to all in-person. To put it simply, having an online education has been absolutely incredible for my academic life; it just works so well for me. Part of the fear involved with going totally back in person is that up to this point all I have been exposed to since I started my actual clinicals is online education so that is all I know and the only modality through which I have succeeded academically since starting clinicals. It will be a huge shock to go back in person, and I am anticipating next semester to be really hard for me and for my classmates due to that reason alone.

Related to keeping pre-recorded lectures after returning to in-person classes this student said, “I don’t know how successful they [VoiceThread®] will be when we return to normal lecture but at least I believe they [VoiceThread®] will serve as a security blanket. If I miss some things in class, I know I have the VoiceThread® to fall back on.”

In addition to these themes, a few students mentioned the online game-based quiz platforms became repetitive and lost their effectiveness after they were used in a majority of the courses week after week. Comments include: “Personally I don’t take them seriously in class,” “after 60 questions, okay, I’m not really listening anymore,” and “It felt like the same questions over and over.” However, some students enjoyed these games and found them beneficial, stating, “I enjoyed having my knowledge tested through [the quiz games],” and “They let us make the [quiz game] questions and I found that helpful.”

4.2.2. Faculty results

Focus groups were conducted with participation from faculty members from each campus. Additionally, a survey was distributed to all faculty on each campus. A total of seven faculty members participated in the focus groups. Data analysis revealed four themes: optimization of technology, faculty as entertainers, collaborative nature of online/virtual learning experiences, and impact on class performance.

4.2.2.1. Optimization of technology.

Faculty levels of comfort with technology impacted the overall experience. This was due in part to the lack of time faculty were given to prepare for this shift in the mode of content delivery. Faculty felt that they were “thrown in” almost overnight, and the ability to adapt varied. Those more familiar with and open to virtual learning platforms such as VoiceThread®, Zoom®, Microsoft Teams®, ShadowHealth®, and others, were able to optimize the use of technology and this translated to a more positive student experience. Participants acknowledged the challenges of educating students during the pandemic, but also recognized that this presented an opportunity to learn more about this mode of teaching, which will be beneficial for the future. One participant stated, “I’m not glad that COVID happened, but I feel that this is going to make me a better instructor because I am going to use all of the tricks in my bag that I have learned.”

4.2.2.2. Faculty as entertainers.

Study participants expressed frustration with the need to “entertain” students to keep them engaged during virtual sessions. While acknowledging challenges that students faced, participants did not feel that it was their role to constantly entertain students and felt that this pressure to entertain may have impacted their effectiveness as educators.

4.2.2.3. Impact of teaching mode.

Participants reported the need for both synchronous and asynchronous learning experiences within courses. They identified the value of VoiceThread® and other asynchronous platforms which contribute to students’ desire for flexibility, but also acknowledged the value of synchronous experiences which hold students more directly accountable. According to one participant, “I think that 90% of what the students learn in my course is in my online collaborative sessions and they will tell you the same thing.” Faculty also found that small group activities in Zoom® breakout rooms were effective in fostering collaborative learning.

4.2.2.4. Overall student performance.

Overall student performance during the pandemic in the classroom setting varied by level of student and by course. While some faculty reported more unsuccessful students, others reported higher grades than previous semesters, which they attributed to the availability of pre-recorded lectures. According to one participant, “I think it has a lot to do with their maturity level and a lot of them just weren’t self-disciplined to do what they needed to do.”

5. Discussion

Many students and faculty were first exposed to online modalities during the COVID-19 pandemic and were forced to rapidly learn and adjust to using a variety of technologies. Studies by Christianson et al. (2002), Kim et al. (2022), and Prestiadi et al. (2020) identified skill and familiarity with online technology, availability of computers and mobile devices, and stability of internet connectivity as factors in effectiveness of teaching and learning. In our study, most participants reported little or no difficulty with availability of devices, technology and internet connectivity. A small number of faculty reported difficulty with computer or internet access. Ali (2020) reported that faculty competence with online technology played a role in student perception of effectiveness of online teaching. In the current study, faculty reported difficulty with making the rapid transition to online teaching and expressed concerns about variation in competence with online technology among faculty members, and worried that a lower level of competence resulted in a less effective experience for students. Faculty discussed student engagement and the perception by faculty of a need to entertain students to keep them engaged in synchronous online course activities. This is supported by findings in the literature by Hampton et al. (2017) and Almendingen et al. (2021) of students’ preference for interactive activities such as quiz games. According to Almendingen et al. (2021) students anticipated poorer learning outcomes with online learning. Conversely, in our study, students stated that they were performing
better with online learning and expressed worries about making the transition back to face-to-face classes without having pre-recorded lectures as a safety net. In accordance with findings by Siah et al. (2022) and others, students participating in this study reported missing human interaction with faculty and peers.

In our study, students rated pre-recorded lectures and videos and question and answer sessions as most effective. Other teaching methods found to be effective were synchronous online learning sessions, case studies, and student response activities such as Kahoot® and other quiz games. Students enjoyed small group collaborative activities, but preferred self-selected groups over random group assignments. These results are consistent with findings of studies by Hampton et al. (2017), Muthuprasad et al. (2021), Almendingen et al. (2021), and others. Faculty in our study rated case studies and small group activities more highly than students but agreed on the effectiveness of other learning activities. Interestingly, a small number of faculty used concept maps as a teaching tool and rated them extremely effective, while students gave concept maps the second-lowest rating of all activities. Faculty stated that a combination of asynchronous pre-recorded lectures and synchronous classes met the students' needs for flexibility, accountability, and peer-to-peer interaction.

The review of literature did not include studies that addressed preferences for a specific online platform. In our study, we did ask students and faculty to rate various online platforms used for synchronous course sessions and found that faculty and students preferred Zoom® to other online meeting platforms.

6. Implications

Being back in the face-to-face environment affords educational institutions the opportunity to be proactive in preparation for an event that causes a shift from the classroom to the online environment. Policies and protocols for the transition should be in place to be implemented when the need arises and should outline how and when online learning technologies will be used. Faculty development offerings can train faculty in online teaching modalities to ease the transition and improve the student experience.

Students cited the flexibility of being able to watch lectures at their preferred time and pace, and to rewatch as often as they desired, and expressed a desire to have access to recorded lectures even after returning to the live classroom. While it may be impractical to provide pre-recorded lectures to students attending live classes, it may be desirable to provide students with lecture slides and allow audio recording of lectures so students can review the lecture content on their own time. At one university that participated in this study, live classes were recorded on Zoom®, with the lecture slides visible, and provided to students for future viewing.

There were some differences between student and faculty perceptions of effectiveness of instructional activities. Students are more likely to engage in activities they perceive to be effective, and faculty should take note of these study results when planning synchronous online sessions. Faculty might consider using some of the activities students deemed effective to increase engagement in the live classroom environment. To introduce students to online technology, faculty may consider conducting question and answer sessions in a discussion forum on the LMS and reviewing the discussions in class. Quiz games and other instructional games may also increase student engagement, allow for short breaks during lectures, and support and reinforce lecture content. Students can be divided into small groups to complete case studies during class, and the case studies can then be reviewed with the entire class. Student presentations are a staple in many classes and faculty will continue to use these as an instructional method, but it should be noted that students had a lower perception of their effectiveness than faculty. Faculty should strive to ensure that the presentations are useful to student learning as well as a method for student evaluation. It is also important for faculty to use these methods judiciously to prevent overuse and boredom.

There was disagreement between faculty and students on effectiveness of assigned readings, with students finding them more effective than faculty. When assigning reading in either the online or face-to-face course, faculty can improve the students' acceptance of assigned readings by actively including the readings in activities, assignments, and lectures. An important consideration for synchronous online class sessions is the online meeting technology used. Faculty and students both rated Zoom® as superior to Microsoft Teams® because of the ability for Zoom® to smoothly handle larger groups as well as small group breakout rooms. Universities should investigate the usefulness of various meeting technologies to ensure faculty and student access to a platform that is user-friendly, capable of handling the necessary class size, and able to support class activities.

7. Limitations

The sample size for this study was small. Of the 613 students and 31 faculty invited to participate, only 104 students and 14 faculty completed the survey. Likewise, participation in focus groups was low, with only a small number of invited participants attending. Low participation may have been due to the study being conducted while invited subjects were still engaged in online teaching and learning and unwilling to add yet more online and virtual activities to their schedules. The study was limited to clinical nursing faculty and students at two universities, and results may not be generalizable to a larger population.

8. Conclusion

This study provides insight into student and faculty perceptions of effectiveness of various online teaching modalities, highlighting similarities and differences in perceptions of the two groups. Faculty and students agreed that pre-recorded lectures were effective for asynchronous instruction, and that interactive activities such as quiz games, question and answer sessions, and virtual small group activities were effective in the synchronous environment. Both faculty and students experienced isolation from peers; synchronous online activities provided social interaction and fostered collaborative learning. Faculty had varied levels of competence and comfort with online technology and expressed concern about how this would impact students. Universities should be proactive in providing training for faculty in the use of online teaching technology; some online teaching methods may translate well into the traditional classroom environment, increasing student engagement in face-to-face classes and smoothing the transition to the online environment as necessary. Natural disasters, epidemics, pandemics, and other circumstances have forced short- and long-term disruptions in face-to-face education in the past, and it is reasonable to expect such disruptions to occur in the future. It is clearly necessary to prepare in advance for the next event that will cause a temporary shift from traditional to online teaching and learning.

CRediT authorship contribution statement

Cynthia Watson: Conceptualization, Investigation, Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration. Tricia Tempel: Methodology, Investigation, Writing – original draft, Writing – review & editing. Gwen Leigh: Methodology, Software, Validation, Formal analysis, Investigation, Data curation, Writing – original draft, Visualization. Lisa Broussard: Methodology, Software, Formal analysis, Writing – original draft, Writing – review & editing, Visualization. Laura Gillis: Methodology, Software, Formal analysis, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial
interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Ali, W., 2020. Online and remote learning in higher education institutes: a necessity in light of COVID-19 pandemic. High. Educ. Stud. 10 (3), 16–22. https://doi.org/10.5539/hes.v10n3p16.

Almendingen, K., Morseth, M.S., Gjestad, E., Brevik, A., Terris, C., 2021. Student’s experiences with online teaching following COVID-19 lockdown: A mixed methods exploratory study. PLoS ONE 16 (8). https://doi.org/10.1371/journal.pone.0250378.

Butnaru, G.I., Nită, V., Anichiti, A., Brînza, G., 2021. The effectiveness of online education during COVID-19 pandemic - a comparative analysis between the perceptions of academic students and high school students from Romania. Sustainability 13 (5311), 1–20. https://doi.org/10.3390/su13095311.

Christianson, L., Tiene, D., Luft, P., 2002. Examining online instruction in undergraduate nursing education. Distance Educ. 23 (2), 213–229. https://doi.org/10.1080/0158791022000009213.

Domina, T., Renzulli, L., Murray, B., Garza, A.N., Perez, L., 2021. Remote or removed: predicting successful engagement with online learning during COVID-19. Sociaus: sociological research for a dynamic. World 7, 1–15. https://doi.org/10.1177/2378023120988200.

Ferri, F., Grifoni, P., Guzzo, T., 2020. Online learning and emergency remote teaching: Opportunities and challenges in emergency situations. Societies 10 (86), 1–18. https://doi.org/10.3390/soc10040086, 2020.

Francis, M.K., Wormington, S.V., Hulme, C., 2019. The cost of online learning: examining differences in motivation and academic outcomes in online and face-to-face community college developmental mathematics courses. Front. Psychol. 10, 1–12. https://doi.org/10.3389/fpsyg.2019.02054.

Hampton, D., Pearce, P.F., Moser, D.K., 2017. Preferred methods of learning for nursing students in an on-line degree program. J. Prof. Nurs. 33 (1), 27–37. https://doi.org/10.1016/j.profnurs.2016.08.004.

Kim, S., Jeong, S.H., Kim, H.S., Jeong, Y.J., 2022. Academic success of online learning in undergraduate nursing education programs in the COVID-19 pandemic era. J. Prof. Nurs. 38 (2022), 6–16. https://doi.org/10.1016/j.profnurs.2021.10.005.

Maskun, M., Rusman, T., Saroto, S., Rahmawati, F., 2020. Student perceptions of online learning. Int. J. Multicult. Multirelig. 7 (2), 67–73. https://doi.org/10.18415/ijmmu.v7i2.1416.

Muthuprasad, T., Aiswarya, S., Aditya, K.S., Jha, G.K., 2021. Students’ perception and preference for online education in India during COVID-19 pandemic. Soc. Sci. Humanit. Open 3 (2021), 1–11. https://doi.org/10.1016/j.ssago.2020.100101.

Peslak, A., Kovalchick, L., Wang, W., Kovacs, P., 2021. Effectiveness of educational delivery modes: A study in computer information systems. Journal of Information Systems Education 32 (4), 253–261. https://jise.org/Volume32/n4/JISE2021v32n4pp253-261.pdf.

Prestiadi, D., Maisyarah, Ariffin, I., Bhayangkara, A.N., 2020. Meat-analysis of online learning implementation in learning effectiveness. In: 6th international conference on education and technology. http://doi.org/10.1109/ICET51153.2020.9276557.

Siah, C.-J.R., Huang, C.-M., Poon, Y.S.R., Koh, S.-J.S., 2022. Nursing students perceptions of online learning and its impact on knowledge level. Nurse Educ. Today 112 (2022), 105327. https://doi.org/10.1016/j.nedt.2022.105327.

Vuttannon, N., Meechamman, C., Sirat, C., Rattanakanlaya, K., 2022. Comparing effectiveness of online and in-class learning in a nursing course during COVID-19. Int. J. Nurs. Educ. 14 (1), 119–127. http://www.ijone.org/.