

# Supplemental Material

*CBE—Life Sciences Education*

Mohammed *et al.*

S1 appendix for

**The experiences of undergraduates with depression in online science learning environments**

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### **Interview questions analyzed**

Thank you for agreeing to interview. My name is \_\_\_\_\_ and I am a biology education researcher and I study ways to improve the experiences of undergraduate science students. To our knowledge, nobody has explored how online learning can affect the experiences of undergraduate science students with depression and we feel this is an important area to further understand.

There are no right or wrong answers to any of these questions. I am going to ask you a series of questions, sometimes it might feel like you've already answered a question that I ask. That's OK. I have to ask all of the questions on my list, so just feel free to elaborate on your answer. Also, there may be times that I interrupt you and redirect you to a question. That's not because I'm not interested in what you have to say, but only because I have a short period of time with you and a lot of questions to ask.

Lastly, we acknowledge that COVID-19 has taken a toll on many people's mental health. However, we want to focus this study on the relationship between online learning and depression without considering COVID-19 challenges, so that our findings will be beneficial to people after COVID-19. The goal of this study is to interview students about their experiences with depression in online science courses, so my first question is, have you experienced depression while taking an online college science course?

*In this interview we are going to ask you questions about how online science courses AFFECT YOUR DEPRESSION. Then, we are going to ask you about HOW YOUR DEPRESSION affects your ONLINE LEARNING IN SCIENCE. When I say online science courses, I'm talking about any learning of college science that you do online, for example a fully online science course.*

We are going to start with how online science courses specifically affect your depression. We are going to start by asking you about how, if at all, some factors of online science learning affect your depression and then we will ask you if there is anything else that we haven't thought about that affects your depression in online science courses. With regard to how depression affects your online learning experience, I'm first going to ask you questions about how your online science courses negatively affect your depression and then I'm going to ask you about how your online science courses positively affect your depression.

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*I'm going to ask you about how specific aspects of your online science courses affect your depression.*

### **Negatives**

Have you ever **struggled to have your questions about course material answered** in online science courses?

[If yes]: Talk to me about how, if at all, **struggling to get your questions about course material answered** in online science courses can make your depression worse.

Have you ever **struggled to make connections with other students** in online science courses?

[If yes]: Talk to me about how, if at all, **struggling to make connections with other students** in online science courses can make your depression worse.

Have you ever **struggled to make a connection with an instructor** in an online science course?

[If yes]: Talk to me about how, if at all, **struggling to make a connection with your instructor** in online science courses can make your depression worse.

Have you ever **experienced a lack of instructor to student communication** in online science courses?

[If yes]: Talk to me about how, if at all, the **lack of instructor student communication** in online science courses can make your depression worse.

In online science courses, you **do not need to show up to a class in person**.

Talk to me about how, if at all, the **lack of needing to show up to a class in person** in online science courses can affect your depression.

Have you ever felt like online science courses can be **fast-paced** in that you are asked to get a lot of work done in a short amount of time?

[If yes]: Talk to me about how, if at all, **the fast pace of online science courses** can affect your depression.

Feel free to take a minute to think about this next question: Is there anything else about online science courses that make your depression worse?

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## **Positives**

*So now we are going to ask you about how aspects of online science courses may positively affect your depression.*

Have you ever been able to **have your questions about course material answered** in online science courses?

[If yes]: Talk to me about how, if at all, **having your questions about course material answered** in online science courses can help you manage your depression?

Have you ever been able to **make connections with other students** in online science courses?

[If yes]: Talk to me about how, if at all, **connections with other students** in online science courses can help you manage your depression?

Have you ever been able to **make a connection with an instructor** in an online science course?

[If yes]: Talk to me about how, if at all, **making a connection with an instructor** in an online science course can help you manage your depression?

Have you experienced a **clear instructor to student communication** in online science courses?

[If yes]: Talk to me about how, if at all, the **clear instructor to student communication** in online science courses can help you manage your depression.

Have you experienced **flexibility to learn on your own time** in online science courses? By flexibility to learn on your own time, I'm talking about asynchronous classes where you do not have to show up online at a specific time.

[If yes]: Talk to me about how, if at all, the **flexibility to learn on your own time** in online science courses can help you manage your depression.

Have you ever felt a **sense of anonymity**, or like people in your class would not necessarily recognize you if they passed you on the street, in online science courses?

[If yes]: Talk to me about how, if at all, a **sense of anonymity** in online science courses can help you manage your depression.

Feel free to take a minute to think about this next question: Is there anything else about online science courses that helps you manage your depression?

## **Effect of depression on online learning**

*We've asked you a bunch about how your online learning experiences have impacted your depression. Now, we would like to switch gears and talk about how your depression has impacted your online learning.*

I'm going to ask you some specific questions about how depression might affect your online learning in science.

Talk to me about how, if at all, your depression affects your **focus** when you are in an online science course.

Talk to me about how, if at all, your depression affects your **memory** when you are in an online science course.

Talk to me about how, if at all, your depression affects your **ability to communicate your thoughts** in the class when you are in an online science course.

Talk to me about how, if at all, your depression affects your **goal setting** for online science courses.

Talk to me about how, if at all, your depression affects your **time management** when you are in an online science course.

Talk to me about how, if at all, your depression affects the **effort you put in** when you are in an online science course.

Talk to me about how, if at all, your depression affects your **problem solving** when you are in an online science course.

Talk to me about how, if at all, your depression affects your **social interactions with other students** when you are trying to learn online.

Feel free to take a minute to think about this next question: Are there any other ways in which you think depression affects your online science learning experience?

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OK, that is all I have for you today. Is there anything else that you think would be helpful to tell me?



**Full demographic table**

<b>Student-level demographics</b>	<b>Interview participants % (n) (N = 24)</b>
<b><u>Parent's highest level of education</u></b>	
High School Diploma or GED	8.3 (2)
Some College but no degree	12.5 (3)
Associate degree (for example, AA, AS)	37.5 (9)
Bachelor's degree (for example, BA, AB, BS)	25.0 (6)
Master's degree (for example, MA, MS, MEng, MEd, MSW, MBA)	16.7 (4)
<b><u>Member of LGBTQ+ community?</u></b>	
Yes	50.0 (12)
No	50.0 (12)
<b><u>Disability</u></b>	
Yes	37.5 (9)
No	62.5 (15)
<b><u>Struggled with Anxiety</u></b>	
Yes	100.0 (24)
No	0 (0)
<b><u>Native Language</u></b>	
English	95.8 (23)
Decline to state	4.2 (1)
<b><u>International Status</u></b>	
Yes	0 (0)
No	100.0 (24)
<b><u>Income Level</u></b>	
Low Income (less than \$25,000)	8.3 (2)

Middle Income (\$25,000-\$49,999)	79.2 (19)
High Income (\$200,000 or higher)	4.2 (1)
Decline to state	8.3 (2)

### Factors hypothesized to negatively affect depression

<b>Overarching factor related to depression</b>	<b>Aspect of course</b>	<b>Citation(s) supporting the notion that this aspect is common in online courses and can affect how students feel.</b>
Failure	Struggling to have questions about course material answered	(Alawamleh et al., 2020; Boling et al., 2012)
Isolation	Struggling to make connections with other students	(Alawamleh et al., 2020; Boling et al., 2012; Jurik et al., 2014)
	Struggling to communicate or connect with an instructor	(Alawamleh et al., 2020; Aragon, 2003; Boling et al., 2012; Duta et al., 2015; Erichsen & Bolliger, 2011; Jurik et al., 2014; Kilgore, 2016; Muilenburg & Berge, 2005; Reese, 2015)
Flexibility/lack of structure	Not needing to show up to a class in person	(Muilenburg & Berge, 2005)
	Fast pace of online courses	(Muilenburg & Berge, 2005; Tank, 2020)

### Factors hypothesized to positively affect depression

<b>Overarching factor related to depression</b>	<b>Factors</b>	<b>Citation(s) supporting the notion that this aspect is common in online courses and can affect how students feel.</b>
Success (lack of failure)	Having questions about course material answered	(Alawamleh et al., 2020; Boling et al., 2012)
Social relationships	Making connections with other students	(Alawamleh et al., 2020; Boling et al., 2012; Croxton, 2014)
	Communicating or making connections with an instructor	(Alawamleh et al., 2020; Aragon, 2003; Boling et al., 2012; Croxton, 2014; Duta et al., 2015; Erichsen & Bolliger,

		2011; Kilgore, 2016; Nguyen, 2015)
Flexibility/lack of structure	Flexibility to learn on your own time	(Fedynich, 2013; Jaggars, 2014; Orr, 2019; Reese, 2015)
	Feeling a sense of anonymity in online courses	(Fedynich, 2013; Jaggars, 2014)

### Coding rubric for how depression affects cognitive domains

Theme	Description	Percent
<b>Effort (N = 24)</b>		
Lack of motivation can affect effort	Student experience procrastination due to putting assignments to last minute and they don't understand or remember the full meaning.	75.00 (n = 18)
Critical of personal effort	Student describes that they question if they are doing enough or putting the optimal effort needed.	66.67 (n = 16)
<b>Focus (N = 23)</b>		
Loss of focus	Student describes that the nature of online education (e.g., pausing a video) makes it easier for them to allow themselves to lose focus for sustained periods of time.	82.60 (n = 19)
Lack of motivation	Student describes a lack of motivation when it is hard to focus in online courses, which could lead to negative self-talk or spiral.	47.83 (n = 11)
Overwhelmed/frustrated/distracted	Student describes they feel overwhelmed when they are not focused and are falling behind.	34.78 (n = 8)
<b>Time management (N = 23)</b>		
Procrastination	Student describes they feel like pushing everything to the last minute.	87.0 (n = 20)
Mental breakdown/depressive episode	Student describes that a mental breakdown or depressive episode can severely interfere with their ability to manage their time.	47.83 (n = 11)
Motivation	Student describes that depression can affect their motivation, which interferes with their ability to manage their time.	30.43 (n = 7)
<b>Communicate thoughts (N = 23)</b>		
Struggle to analyze information	Student describes that they cannot correctly analyze information or put their thoughts into words, which affects how they retain the module or causes them to write poorly on a discussion board.	47.83 (n = 11)
Fear of judgement	Student describes that they are discouraged to communicate because of fear of being judged, do not have confidence to communicate.	26.09 (n = 6)

Doesn't try	Student describes that they do not communicate about questions or anything generally.	21.74 (n = 5)
Enjoys written communication	Student describes that they like to communicate their thoughts non-verbally because they can edit.	21.74 (n = 5)
<b>Goal setting (N = 20)</b>		
No self-expectations/self-doubt	Student describes that they do not expect much for themselves in online courses and they try to just keep up with the bare minimum. Student also describes that they struggle with creating goals because of their own doubts on any potential self-expectations.	50.00 (n = 10)
Overwhelming	Student describes that they try to put all assignments into a calendar but over time that piles up and they are just staring at the computer for hours not doing anything, which puts their goals off.	40.00 (n = 8)
Lack of motivation	Student describes that they do not feel enough motivation to start studying in online courses.	25.00 (n = 5)
<b>Problem solving (N = 20)</b>		
Depression affects focus which affects problem solving	Student describes that if they are not focused, they are more likely to not problem solve, or it will be slowed down (foggy).	65.00 (n = 13)
Depression can make giving up easier	Student describes that they tend to be more tempted to give up when struggling to problem solve.	25.00 (n = 5)
<b>Memory (N = 17)</b>		
Dissociation	Student describes that they tend to disassociate, which affects how well they remember things and questions if they are mentally present to even remember.	94.12 (n = 16)
Energy and motivation	Student describes that they do not have the time, energy, and/or motivation to commit to memorize anything.	41.18 (n = 7)
<b>Social interactions (N = 17)</b>		
Depression makes social interactions exhausting	Student describes that it takes energy and is exhausting trying to connect with other students, or that it is not happening as easily as they would like.	76.47 (n = 13)
Depression causes bad mood	Student describes that when they are depressed, they are not a nice person and would not interact with anyone.	35.29 (n = 6)

### Coding rubric for negative factors that affect depression

Theme	Description	Percent
<b>Fast pace of online courses (N = 24)</b>		
<i>Specific aspects of fast-paced courses that can exacerbate student depression</i>		
Falling behind	Student describes that it is easy to fall behind in a fast-paced environment.	75.00 (n = 18)
Retaining info	Student describes the fast pace of online courses makes it difficult to retain any information.	33.33 (n = 8)
Lack of positive reinforcement	Student describes that due to the fast-paced nature in online courses, there seems to be a lack of reward or reinforcement for their accomplishments in the class because there is no time to do so, which exacerbates their depression.	12.50 (n = 3)
<i>How fast-paced environment affects depressive symptoms</i>		
Overwhelmed/spiral	Student describes that the amount of information coming at them in a short period of time can cause them to feel overwhelmed or to spiral with negative thoughts.	83.33 (n = 20)
Hard/critical on themselves	Student describes that falling behind specifically can cause them to be critical of themselves.	58.33 (n = 14)
Fatigue, tired, no motivation	Student describes that the intensity and fast pace of online courses makes them more tired, fatigued, and less motivated.	41.67% (n = 10)
<b>Not needing to show up to class in person (N = 16)</b>		
<i>Specific aspects of not showing up that can exacerbate student depression</i>		
Lack of structure is challenging	Student describes that not showing up can cause a lack of structure or routine that can exacerbate depressive symptoms (e.g., no motivation to get out of bed, to shower).	68.75 (n = 11)
Being alone/lack of interaction	Student describes that due to the online nature of their courses, they feel alone and isolated from the rest of the class because there is a lack of showing up to class in person. This causes them to not communicate or interact with others face-to-face, exacerbating their depression.	62.50 (n = 10)
Lack of positive reinforcement	Student describes that when you show up in class it can be helpful because you are more likely to receive positive reinforcement.	31.25 (n = 5)
<i>How not showing up in class in person affects depressive symptoms</i>		

Increases lack of motivation	Student describes hardship to find motivation and get out of bed since they don't have to physically be in a classroom, no routine, or lack of structure.	68.75 (n = 11)
<b>Difficulty developing a relationship with other students (N = 20)</b>		
<i>Specific aspects of online education that make it difficult to connect with other students</i>		
Harder to connect with people not face-to-face	Student describes that typing out social responses is difficult online. Student describes that they feel their opinions are shut down due to a difference in opinion when posting at a discussion board, which makes it discouraging to connect with other students.	70.00 (n = 14)
No time set aside for socializing	Student describes that they feel there is no venue and time to make friends or engage with students online.	35.00 (n = 7)
Forced social interaction	Student describes they don't like the "forced" interaction to engage.	15.00 (n = 3)
<i>How struggling to connect with the students affects depressive symptoms</i>		
Isolation	Student describes how not connecting with other students online can make them feel isolated. They can also describe how in-person connections make them feel like a part of a team (implying this is absent from online environments).	70.00 (n = 14)
Personal low self-image (dumb, bad, worthless)	Student describes that they feel worthless if they reach out to others in class and it is not reciprocated.	40.00 (n = 8)
Spiraling/overwhelmed	Student describes that not being able to connect with other students causes them to feel overwhelmed or lost, which ends up making the student spiral emotionally.	30.00 (n = 6)
<b>Difficulty communicating or developing a relationship with the instructor (N = 19)</b>		
<i>Specific aspects of online education that make it difficult for students to connect or communicate with instructors</i>		
Lack of support	Student describes that they don't have instructor support online and some instructors provide minimal effort when student tries to connect.	84.21 (n = 16)
Lack of positive reinforcement/lack of feedback	Student describes that having a lack of positive reinforcement or lack of positive reaffirmation can exacerbate their depressive symptoms. Student describes that it was anxiety inducing that the professor would communicate late or share an announcement after something was due, so responding late or not responding at all was overwhelming.	78.94 (n = 15)
<i>How struggling to connect or communicate with the instructor affects depressive symptoms</i>		
Assumption that the instructor	Students describes that if they are unable to connect with instructors (e.g., if an instructor does not reply to them) then they are viewed by the instructor as not capable or not	73.68 (n = 14)



views them negatively	meeting their expectations.	
Personal low self-image (dumb, bad, worthless)	Student describes that when they try to connect with an instructor and the instructor does not make the effort to personally reply it came make them feel “dumb,” “bad,” or “worthless.”	47.37 (n = 9)
Emotional distress/spiral	Student describes that when they struggle to communicate with the instructor it can cause them to feel increasingly frustrated or irritable. Student describes that due to a lack of communication, they feel that there is no one they can go to, or in other words defeated.	47.37 (n = 9)
Lack of motivation/giving up	Student describes that a lack of communication with the instructor can cause them to feel hopeless, like they should give up, or unmotivated.	36.84 (n = 7)
Assumption that the instructor views them negatively (FNE)	Student describes that a lack of student/instructor communication makes them feel as if the instructor views them in a negative way such as the student is a burden or various other negative factors.	26.31 (n = 5)
<b>Difficulty having questions answered (N = 18)</b>		
<i>Specific aspects of online education that make it difficult for students to have questions answered</i>		
Questions can be misunderstood	Student describes that their questions are not understood due to language barriers, in-text communication issues, lack of accommodations, or anything else that the student feels makes it harder to get their question across in an online format.	61.11 (n = 11)
Difficult to get questions answered on time	Student describes that it is difficult for their depression if they cannot get questions answered on time. Student describes they do not feel in control of the learning pace due to the time they spent receiving an answer from the professor and sometimes not even receiving a response back.	33.33 (n = 6)
Online can be more public or intimidating (FNE)	Student describes that asking a question online can be more public. As such they are embarrassed or struggle to ask questions in front of the class or in groups because of fear of negative evaluation.	16.67 (n = 3)
<i>How struggling to get questions answered affects depressive symptoms</i>		
Low self-image/feeling stupid	Student describes that not getting their questions answered can cause them to feel negatively about themselves, specifically they feel stupid. This can be because they do not understand something or because they did not phrase a question correctly.	88.89 (n = 16)
Causes spiraling	Student describes that not having a question answered can cause them to spiral. For example, student describes how not getting a question answered can lead to thoughts about having trouble with the assignment, then the course, then being stupid, then never doing anything. In short, this can cause a small concern to lead to an array of depressive	33.33 (n = 6)

	thoughts.	
Creates a feeling of helplessness/hopelessness/defeat	Student describes that not being able to get questions answered can cause a feeling of helplessness, hopelessness, or defeat (often we see the pattern that not getting a question answered can lead to confusion which results in these more negative feelings).	27.78 (n = 5)
<b>Lack of structure and accountability of online courses (N = 11)</b>		
<i>Specific aspects of lack of structure and accountability that can cause exacerbate student depression</i>		
Due dates	Student describes that a lack of structure can exacerbate their depression because it is hard to be self-controlled and this can lead to a depression spiral.	100.00 (n = 11)
Doubt about preparedness	Student describes that they doubt online courses prepare them well enough and then doubt their ability as a scientist.	27.27 (n = 3)

### Coding rubric for positive factors that affect depression

Theme	Description	Percent
<b>Flexibility to learn on your own time (N = 24)</b>		
<i>Specific aspects of flexibility that leads to a positive impact on depression</i>		
Allows for navigating depressive symptoms	Student describes that having flexibility helps when they don't have the energy or motivation for coursework or the mental stamina. Flexibility allows students to recover (e.g., stay in bed, break down and cry) and this is posed as a good thing.	75.00 (n = 18)
Workload/work-life balance	Student describes that having the flexibility to learn on their own time allowed them to work full-time and survive school and life (e.g., family events, therapy).	58.33 (n = 14)
Feeling of control	Student describes that the flexibility to learn on their own time is helpful for their depression because it provides a feeling of control over their life.	41.67 (n = 10)
Productive	Student describes they feel more productive because of the flexibility of online courses.	37.50 (n = 9)
<i>How flexibility affects depressive symptoms</i>		
Manageable/comfortable/stress reducing	Student describes that the flexibility to work at their own pace and manage their own schedule allowed them not only to learn, but to be comfortable with how they are learning.	91.67 (n = 22)
<b>Student able to clearly communicate or develop a relationship with the instructor (N = 24)</b>		
<i>Specific aspect of communicating/connecting with the instructor-students affects depressive symptoms</i>		
Time management/structure	Student describes they have better time management in online course when instructions are clear. Student may also describe this as work-life balance. Student may also describe that they feel a sense of structure and are able to plan their time better.	62.50 (n = 15)
Helps clear things up/positive reinforcement	Student describes that getting help from instructors might rationalize things instead of exaggerating issues.	45.83 (n = 11)
Affirming/validating	Student describes that when they are able to successfully communicate with the instructor, they feel important, validated, or affirmed.	41.67 (n = 10)
Productive	Student describes that they feel productive when they have everything they need and they actually look forward to doing the work when they make a connection with their instructor.	25.00 (n = 6)

More motivated	Student describes that when they successfully communicate with the instructor, they are more motivated to learn or complete work.	25.00 (n = 6)
Avoids shutting down	Student describes when they successfully communicate with the instructor it helps them avoid shying away or shutting down.	12.50 (n = 3)
<i>How communicating/connecting with the instructor students affects depressive symptoms (N = 20)</i>		
Support	Student describes that making connections with the instructor makes them feel supported, like they have someone they can go to if they have a question or if they're struggling. Student describes that when reaching out to the instructor about something not working, the instructor would explain that it was ok and that other students are also having the same problem and sent out an announcement instead of missing the material.	70.83 (n = 17)
Not feeling alone/isolated	Student describes that making connections with the instructor or simply having an instructor that cares about the course can help them feel less isolated or alone.	54.17 (n = 13)
<b>Ease having questions answered (N = 22)</b>		
<i>Specific aspects of having questions answered that can lead to a positive impact on depression</i>		
Control	Student describes that they feel in control and not overwhelmed when their questions are answered.	45.45 (n = 10)
Relief	Student describes that they feel relieved and calm when their questions are answered.	36.36 (n = 8)
<i>How having questions answered affects depressive symptoms</i>		
Stops spiral/pressure	Student describes that having their questions answered can stop a spiral of negative thoughts.	54.55 (n = 12)
Be a light/support	Student describes that having their questions answered can serve as a "light" or source of support when they are in a dark place.	40.91 (n = 9)
Motivated	Student describes that they feel more motivated and less tired when a TA or professor is helping and that they are not alone.	40.91 (n = 9)
Less isolated	Student describes that they feel less isolated when someone might have the same question as them.	31.82 (n = 7)
<b>Anonymity (N = 20)</b>		
<i>Specific aspects of how anonymity affects depressive symptoms</i>		

Do not have fear of negative evaluation	Student describes how the anonymity of online education means that they do not spend time worrying about how others will evaluate them. Particularly, they do not have to worry about whether people will judge their questions or opinions. This includes if a student mentions they do not need to be people pleasing.	95.00 (n = 19)
Comfortable	Student describes that they prefer to be anonymous because they are more of an introvert, they are working alone, live alone, or it is more comfortable.	45.00 (n = 9)
Less responsible for shared work	Student describes they feel capable not relying on other students and in control of their own grade.	15.79 (n = 3)
Manageable	Students describes working with students makes the work more manageable.	15.79 (n = 3)
<b>Developing a relationship with other students (N = 19)</b>		
<i>Specific aspects of connecting with other students that leads to a positive impact on depression</i>		
Helps to know other people are going through the same things	Student describes that knowing there are other people with similar questions or other people going through similar material helps their depression.	84.20 (n = 16)
Accountability	Student describes feeling that they are held accountable when they can connect with others online.	31.58 (n = 6)
Better able to engage in the course	Student describes that they are better able to engage in the course if they are able to engage with other students.	31.58 (n = 6)
<i>How making connections with other students affects depressive symptoms</i>		
Relieves isolation/increases motivation	Student describes feeling less isolated when they are able to connect with other students.	78.95 (n = 15)
More joyful	Student describes that when they make a connection with other students it is enjoyable to have someone to look for in their asynchronous online courses and it made them feel prepared because they know who they are going to be working with.	10.53 (n = 2)

## References

- Alawamleh, M., Al-Twait, L. M., & Al-Saht, G. R. (2020). The effect of online learning on communication between instructors and students during Covid-19 pandemic. *Asian Education and Development Studies*.
- Aragon, S. R. (2003). Creating social presence in online environments. *New Directions for Adult and Continuing Education*, 2003(100), 57–68.
- Boling, E. C., Hough, M., Krinsky, H., Saleem, H., & Stevens, M. (2012). Cutting the distance in distance education: Perspectives on what promotes positive, online learning experiences. *The Internet and Higher Education*, 15(2), 118–126.
- Croxton, R. A. (2014). The role of interactivity in student satisfaction and persistence in online learning. *Journal of Online Learning and Teaching*, 10(2), 314.
- Duta, N., Panisoara, G., & Panisoara, I.-O. (2015). The Effective Communication in Teaching. Diagnostic study regarding the academic learning motivation to students. *Procedia-Social and Behavioral Sciences*, 186, 1007–1012.
- Erichsen, E. A., & Bolliger, D. U. (2011). Towards understanding international graduate student isolation in traditional and online environments. *Educational Technology Research and Development*, 59(3), 309–326.
- Fedynich, L. V. (2013). Teaching beyond the classroom walls: The pros and cons of cyber learning. *Journal of Instructional Pedagogies*, 13.
- Jaggars, S. S. (2014). Choosing between online and face-to-face courses: Community college student voices. *American Journal of Distance Education*, 28(1), 27–38.

- Jurik, V., Gröschner, A., & Seidel, T. (2014). Predicting students' cognitive learning activity and intrinsic learning motivation: How powerful are teacher statements, student profiles, and gender? *Learning and Individual Differences, 32*, 132–139.
- Kilgore, W. (2016). Let's talk: Effectively Communicating with your Online Students. *Humanizing Online Teaching and Learning*.
- Muilenburg, L. Y., & Berge, Z. L. (2005). Student barriers to online learning: A factor analytic study. *Distance Education, 26*(1), 29–48.
- Nguyen, T. (2015). The effectiveness of online learning: Beyond no significant difference and future horizons. *MERLOT Journal of Online Learning and Teaching, 11*(2), 309–319.
- Orr, T. (2019). *Women with depression in online learning: A descriptive phenomenological analysis*.
- Reese, S. A. (2015). Online learning environments in higher education: Connectivism vs. dissociation. *Education and Information Technologies, 20*(3), 579–588.
- Tank, P. (2020). *Technical issues, pandemic trauma, lack of motivation, time management skills: Students suffer throu- Edexlive*. <https://www.edexlive.com/news/2020/aug/25/technical-issues-pandemic-trauma--time-management-students-suffer-through-online-classes-14127.html>