



## Online Indigenous University Student Supports, Barriers, and Learning Preferences

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**Abstract:** The research goals were to identify the key supports, barriers, and learning preferences related to the persistence of online Indigenous university students. Two Indigenous community meetings were held, 212 online Indigenous students were surveyed, 20 Indigenous students were interviewed, and a talking circle was held with six Indigenous university online students. The strongest converging factors related to persistence were (a) cultural; recommendations for more Indigenous faculty and culture on campus, (b) social; good relationships with faculty and students, positive social environment, time management, and motivation, (c) cognitive; literacy, mathematics, and computer skills, and (d) physical; financial support, affordable housing, family support, and non-academic support at university. Students preferred embedded media, graphics, virtual environments, and games over other online design elements. Email was the preferred method to communicate with faculty. Texting, using social media, and virtual environments were preferred to communicate with other students. Most students had extensive experience with texting, Facebook, and chat, but far less experience with blogs, Twitter, or Wikis. Students liked group work but assigning one mark for group projects worked against social cohesion. Most students reported having the skills needed to complete online courses, with the exception of time management. The findings support a wholistic Indigenous human model of university persistence that includes intersecting social, cognitive, physical, and cultural components.



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**Keywords:** Indigenous, Aboriginal, persistence, university, online, Indigenous student experience, Canada

**Résumé:** Les objectifs de la recherche étaient d'identifier les principaux soutiens, obstacles et préférences d'apprentissage en lien avec la persévérance des étudiants universitaires autochtones en ligne. Deux réunions au sein d'une communauté autochtone ont été organisées, 212 étudiants en ligne autochtones ont été interrogés, 20 étudiants ont été interviewés, et un cercle de discussion a été organisé avec six étudiants universitaires en ligne autochtones. Les facteurs convergents les plus fortement en lien avec la persévérance étaient (a) culturels : recommandations d'une présence accrue de professeurs et de culture autochtones sur le campus, (b) sociaux : bonnes relations avec les professeurs et les étudiants, environnement social positif, gestion du temps et motivation, (c) cognitifs : compétences en littératie, mathématiques et informatique, et (d) physiques : soutien financier, logement abordable, soutien familial et soutien non académique à l'université. Les étudiants ont préféré les médias intégrés, les graphiques, les environnements virtuels et les jeux à d'autres éléments de design de cours en ligne. Le courrier électronique était la méthode préférée pour communiquer avec le corps enseignant. Les textos, les médias sociaux et les environnements virtuels ont été privilégiés pour communiquer avec les autres étudiants. La plupart des étudiants avaient une grande expérience des textos, de Facebook et du chat, mais beaucoup moins des blogs, de Twitter ou des wikis. Les étudiants ont aimé le travail en groupe, mais l'attribution d'une note pour les projets de groupe est allée à l'encontre de la cohésion sociale. La plupart des étudiants a déclaré avoir les compétences nécessaires pour suivre des cours en ligne, à l'exception de la gestion du temps. Les résultats soutiennent un modèle humain autochtone holistique de persévérance universitaire qui comprend des éléments sociaux, cognitifs, physiques et culturels qui se croisent.

**Mots-clés:** autochtone, aborigène, persistence, université, en ligne, expérience des étudiants autochtones, Canada

## Introduction and Background

There are more Indigenous students going to university now and we fought for a long time to get that. We fought to get grade 3, then grade 7, and we got high school in 1951 (Arnouse, 2009).

Indigenous education in Canada has a history of decades of colonialism and residential schooling with the goal of eliminating and replacing Indigenous culture. Residential school attendance of children as young as five was compulsory, and there was widespread upheaval in Indigenous communities as the children, the centre of the community, were taken away. Battiste (2000) concluded that the current relatively low attendance of Indigenous students at university is a long-term impact of the residential schools. The 2011 National Household Survey census in Canada revealed that only 9.8% of Indigenous people had completed a university degree, compared to 26.5% for the general population (Statistics Canada, 2011). Indigenous theorists have recognized that universities play a role in enabling or disabling the social experience of Indigenous students at university (Pidgeon 2009; HeavyRunner, 2009; **Smith, 2014**). Pidgeon (**Pidgeon, 2009; Pidgeon, 2014**) and Shwartz and Ball (2001) interviewed Indigenous university graduates and found that Indigenous social interactions and ceremonies were strong supports. Berger, Motte, and Parkin (2007) surveyed off-reserve Indigenous students and found that most who left university reported a lack of satisfaction with their program (52%), financial reasons (22%), and academic difficulties (12%).

The research reported here originated as a request from a Canadian mid-sized university Indigenous advisory committee for information on how the graduation rate (persistence) of Indigenous students could be improved. **The university has a focus on developing and offering** online courses, and this includes providing programs to remote Indigenous communities. The main purpose of this research was to identify strategies that could

increase the persistence of Indigenous students taking online courses. An online survey, a semi-structured interview, and talking circles were used to collect this information with a sample of 238 Indigenous students. The research presented here attempts to address the Truth and Reconciliation Commission of Canada (2015), especially Call to Action 10 on improving Indigenous education attainment levels and success rates and developing culturally appropriate curricula.

### **Research with Online Indigenous University Students**

There is little research with online Indigenous university students and those findings are summarized here. Fahy and Steel (2011) found that barriers to success that Indigenous students face in rural communities include online course logistical and timing problems, childcare, transportation, scheduling, cost, and limited access to qualified instructors and technology. They concluded that distance delivery can decrease the effect of many of these barriers by allowing students to remain in their home location. Learning online in home communities can potentially facilitate learning based on their current environment and relevant experiences (Cochrane & Maposa, 2018; Tessaro et al., 2018).

In a study of the learning preferences of residents in four northern Alberta communities, many of whom were Indigenous, Fahy, Steel, and Martin (2009) found that access to educational programs was a key issue and leaving the community to travel for educational opportunities was often unsuccessful. They found that over 40% of respondents would register in online programs, especially if the programs included adult upgrading, business, and other career advancing courses.

Kawalilak et al. (2012), in a study of adult Indigenous learners in rural Alberta communities, identified a number of barriers to success, including access to education (without having to leave the community), technology barriers such as poor Internet connectivity, and a lack of sensitivity to the unique learning styles of the members of these communities. These authors concluded that the two key factors were motivation (high

desire to obtain post-secondary education) and relationships with other students and instructors. Online learning was seen as providing access to specialized instructors who were not available in the community.

Sharpe (2000) conducted a telephone survey with 181 students in rural Newfoundland (9% Indigenous population) who were taking online courses from Memorial University. Working, taking courses, and time management were rated as problematic by 70% of participants, and 50% mentioned family commitments. Almost 60% of respondents reported they were part of the university community and 24% enjoyed the interactive nature of their courses. Twenty-five percent noted they also took face-to-face courses. Many students (20%) noted felt disconnected because of the distance between their home and the St. John's campus. These findings were consistent with similar research completed by Philpott, Sharpe, and Neville (2009) with students in Labrador.

Several researchers (Doering, 2014; Loewen et al., 2018) concluded that including knowledge holders and community members in the online course design process was important, as was the inclusion of Indigenous culture in learning materials and activities. For example, digital storytelling could potentially incorporate Indigenous knowledge into learning.

There are recent meta-analyses of online research and although these summaries included few Indigenous students, the findings are potentially informative to Indigenous online learning, especially in the context of the limited research with Indigenous students.

### **Meta-analyses and Syntheses of Online Research**

Recent meta-analyses of research on online learning (Agreda Montoro et al., 2019; Allen & Seaman, 2010; Corry et al., 2014; Farrel et al. 2018; Means et al., 2017) found several strong and consistent findings across studies, although only a very small number included Indigenous subjects. These findings are potentially relevant for Indigenous students and

key factors identified in the meta-analyses were assessed in this project. Potentially relevant findings from the meta-analyses were:

1. Most students preferred and did better in blended courses with online components compared to courses without it.
2. Give learners control of interaction with media (e.g., allow students in groups to decide how to communicate with each other, like Google docs and Facebook, rather than require the use of Moodle or Blackboard).
3. Incorporate activities that prompt learner reflection and extension.
4. Group work can facilitate engagement but having one group mark without individual student accountability can work against that.
5. Individual tutoring is more effective than group support, and group support is more effective than self-instruction.
6. More videos (e.g., of lectures) are not always better as they may be more time-consuming to review than PowerPoint presentations.
7. Reduce the number of logins to get to online communications sites and resources (e.g., Moodle), especially from cellphones.
8. The use of learning analytics can help to identify factors that affect learning outcomes.

In summary, the research on Indigenous online university course completion is based largely on a small number of survey research projects based in northern Alberta. That research found that online course delivery has the capacity to decrease the effect of many of the barriers experienced by Indigenous university students by enabling them to remain in their community where they have family and other supports. Indigenous students also preferred that courses be offered at times so that full-time workers could register. Also, students requested that courses contain more Indigenous culture and knowledge.

## **Research Methods**

Two goals of the research were to identify strategies that could increase the persistence of Indigenous students taking online university courses, and to identify their online learning preferences. A convergent mixed-methods approach was used and began by meeting with four faculty and staff from the online division involved in online course design at the university. Next, meetings were held with two Indigenous communities to learn about their experience with online university education. One community had a completion rate of 82% and a second community had completion rates as low as 3%. We also surveyed 212 Indigenous students, interviewed 20 students, and held a talking circle with six students, all of whom had taken or were taking university courses online.

The framework for the talking circles and interviews was based on Storywork (Archibald, 2008), a way of looking at interviews as people telling stories of their lives. This research rests on the assumption that researchers needed to hear the stories of Indigenous students and from their communities to identify the key factors related to Indigenous online persistence.

## **Participants**

Twenty Indigenous students were interviewed for the project, 212 completed online surveys, six students participated in a talking circle, and seven education workers from Indigenous communities were involved in open-ended discussions. All students were in undergraduate programs and were in years one to seven of their program at a mid-sized university in Canada. In addition, a discussion on online course design related to the topics of supports and barriers for persistence was held with four faculty and staff from the online division at the university.

**Interviews.** The director of the Indigenous gathering place on campus asked students if they would like to be interviewed for the research project. All interviewed

students had taken a varied number of online courses, but most had taken only one online course ( $n = 12$ ), while others had taken up to ten courses. Students varied in age from 19 to 61 years of age ( $M = 38.5$ ), and there were 14 women and six men. Nineteen students identified as First Nations and one as Inuit. Students came from rural and urban centres, but many had lived in both environments ( $n = 9$ ). All of the students reported having access to a computer and the Internet, but several students ( $n = 4$ ) did not have a data plan for their cellphones, which rules out mobile Internet access. Regarding Indigenous language ability, three students reported that they could speak their language well, and two of those could also write fluently. Eight students (40%) indicated that they could not speak their Indigenous language.

**Surveys.** All 327 Indigenous students at the university in baccalaureate programs who had taken an online course in the previous year were invited by email to participate in the project. There were 212 students who completed the survey (72% completion rate). The average age was 33.5 years ( $SD = 10.3$ ). There were 170 females, 41 males, and two selected “other” for gender. Thirty-three students did not report their gender.

### **Creating an Online Survey**

Following our review of literature on online learning, it was apparent that a survey for Indigenous students to identify their supports, barriers, and learning preferences needed to be created.

The survey on online persistence created for this study was based on a survey developed to study persistence with Indigenous university students taking face-to-face courses (Walton, Hamilton, Clark, Pidgeon, & Arnouse, submitted for publication). In that research, Arnouse, an elder from a local Indigenous community, focused on the importance of a wholistic model of a person that included four components: social, cognitive, physical, and cultural. He described this model as an ancient way of life that



many are trying to revive. The survey with face-to-face included several items that assessed each of the four components, and the online survey did as well. Four of 17 items from the face-to-face survey were dropped in the online survey as they were not relevant to online courses. Five items were added to the online survey (e.g., technical support) for a total of 18 items on persistence (see Appendix A).

The Indigenous online survey was piloted with six students, most of whom had only limited experience with available online teaching options (e.g., had not used chats in an online course). This would make it impossible for students in the sample to provide feedback on different online teaching experiences. To compensate for this lack of experience, we created an online survey that included video vignettes in the areas of student-to-student engagement, student-to-faculty engagement, and engagement with content (see Appendix A). For several survey questions, students were asked to view a brief video (typically less than one minute) that illustrated the use of a particular online teaching strategy and were then asked for feedback. Our survey also included questions related to family, financial, and other factors that were found to be important by previous research with Indigenous online students in Canada (e.g., Fahy, 2009) and findings from the meta-analyses on online learning.

## **Findings**

### **Indigenous Community Meetings**

The online learning department at the university had information on the online course completion rates of Indigenous students. Two authors, one of whom is an elder, met separately with two Indigenous communities in British Columbia to talk about the supports, barriers, and online learning preferences. Students in one community in the lower mainland of BC had an online course completion rate of 82%, which is very high, and another community in the Interior of BC have completion rates as low as 3%.

We met with four Band members responsible for education in the lower mainland community and with two of the online university students. A key feature of the lower mainland community experience was that online students met weekly in scheduled face-to-face meetings that included academic tutoring and childcare. Providing childcare enabled the online students, mostly mothers, to attend the sessions. The Band members attributed the high success rate to the services provided by the Band.

The second Indigenous community meeting was held in the Interior with two Indigenous community members and one education facilitator. The completion rate of Indigenous students in this region was 3% for some programs. Their online course sometimes consisted primarily of a mailed textbook and was similar to a traditional correspondence course. In several courses, there was no contact with the professor or other students. The online students did have the supports offered to students in the community with the higher completion rate.

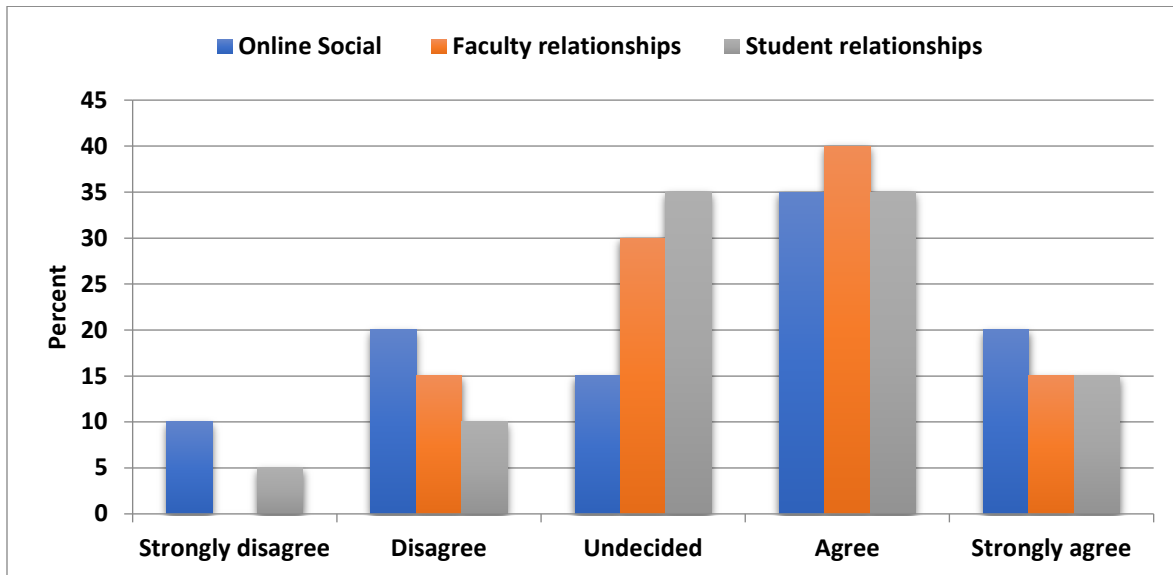
## **Survey and Interview Findings**

### ***Positive Social Environment and Relationships***

Our research on Indigenous retention with face-to-face students (Walton et al., 2020) found that the strongest predictors of program completion were engagement factors, especially relationships with faculty and other students, and a positive social environment. Three questions on these important factors were included in the online survey. The student responses are presented in Figure 1.

**Figure 1**

*Positive Online Course Social Environment and Relationships*



*Note.* Responses based on a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

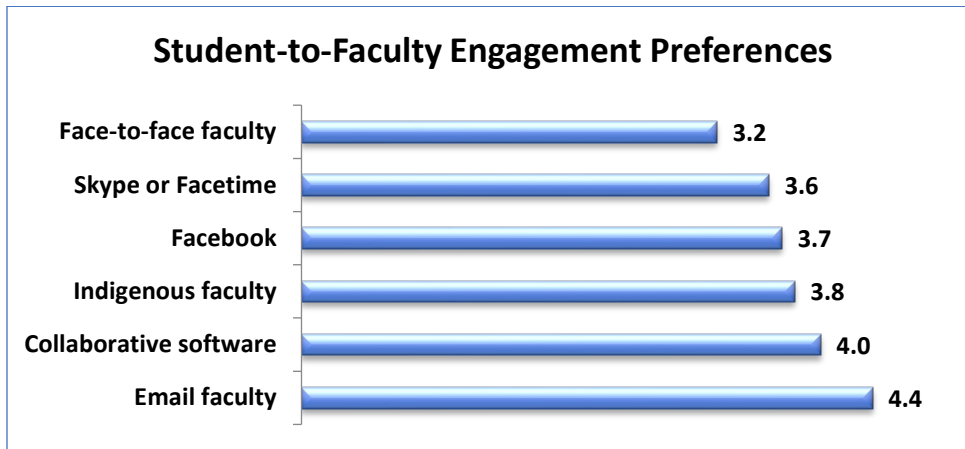
As can be noted in Figure 1, most students responded that their online course provided a positive social environment (55%), and that they had good relationships with their faculty (55%), and with other students (50%). However, 30% of the online students indicated that the online courses were not a positive social environment, did not have good relationships with faculty (15%), or with other students (15%).

***Student to Faculty Engagement Preferences***

It was useful to learn that most students had good relationships with online faculty, but we also wanted to determine how those relationship could be improved. Our survey included questions that asked students to rate online practices on how effective the practices would be to increase student-to-faculty engagement.

**Figure 2**

*Student to Faculty Engagement Preferences*



*Note.* Responses based on a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

Figure 2 shows that email was the preferred method to communicate with faculty and using collaborative software was the second choice. Least favoured ways to engage with faculty were Facebook, Skype, or FaceTime. Most students reported in the interviews that the most effective way to enhance faculty engagement would be to have easy access to faculty (e.g., email, collaborative software) and to receive quick responses to requests.

***Student to Student Engagement***

The Indigenous students were also asked to rate online practices that would improve student to student engagement. As can be seen in Figure 3, students reported that texting and using social media or virtual environments were the preferred methods to enhance student to student engagement. Most students were very positive about opportunities to discuss topics or work on projects with other students.

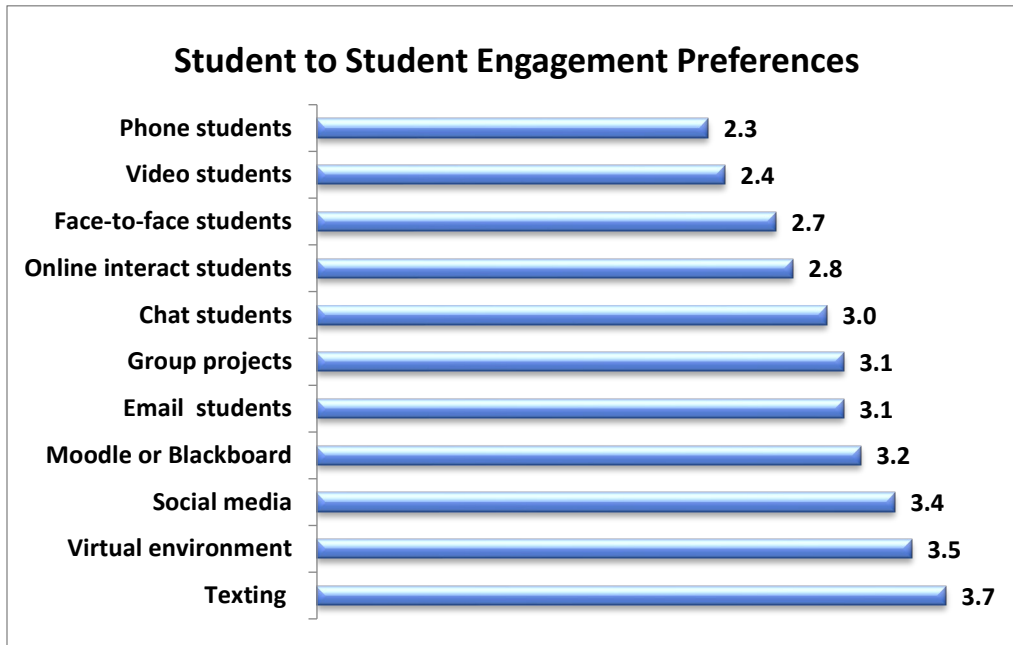
Importantly, many Indigenous students stated that assigning one mark for a group project (i.e., everyone in group receives the same mark) often worked against group cohesion.

This occurred, for example, when a student repeatedly missed group meetings. One student suggested having group projects but also have a way to give students individual

marks for their contribution. Many Indigenous students reported that having international students in online courses would enhance student relationships.

**Figure 3**

*Student to Student Engagement Preferences*



***Preferred Online Course Design Elements***

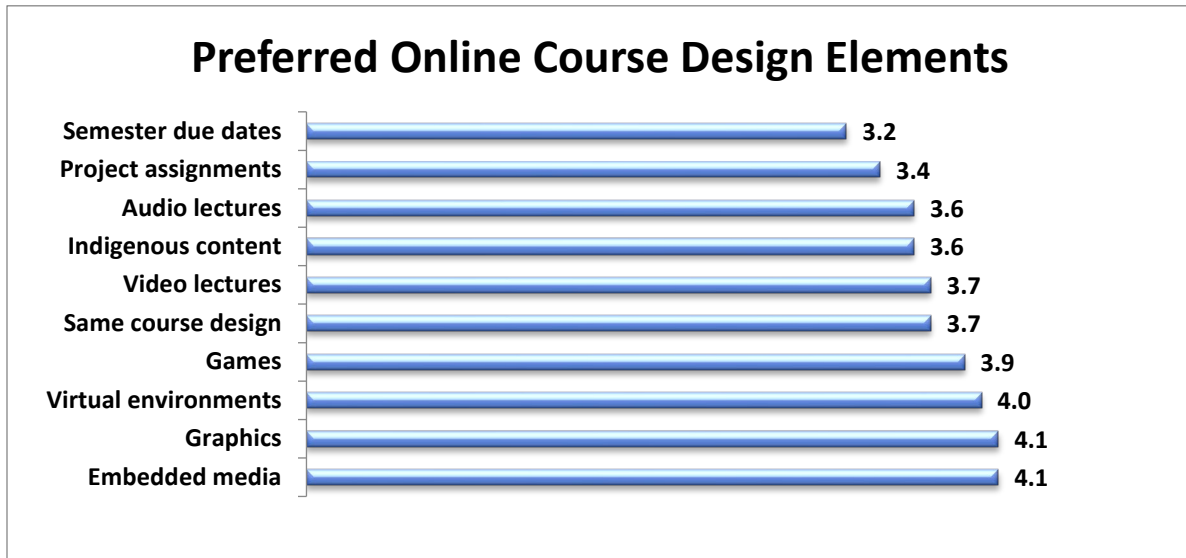
There are a wide range of learning and teaching strategies and activities that can be used in online course delivery and recent meta-analyses reported the online learning preferences of non-Indigenous students, but the goal here was to identify the preferences of Indigenous students. The survey included items that asked students to rate the importance of a wide range of online course learning activities.

Importantly, many Indigenous students who had or were taking online courses had experienced only a very limited range of online learning methods. To provide students with a wide range of online learning experiences, vignettes on an extensive range of online learning technologies were embedded in the survey. For many survey items, students

watched the video vignette and then commented on the method in the video (see Appendix A).

**Figure 4**

*Preferred Online Course Design Elements*



As seen in Figure 4, students would prefer to have embedded media, graphics, virtual environments, and games as online course design elements. Note that group projects were one of the least preferred design elements. This finding converges with the interview findings where students reported having one group mark often worked against group cohesion, and yet they spoke very highly of group discussions.

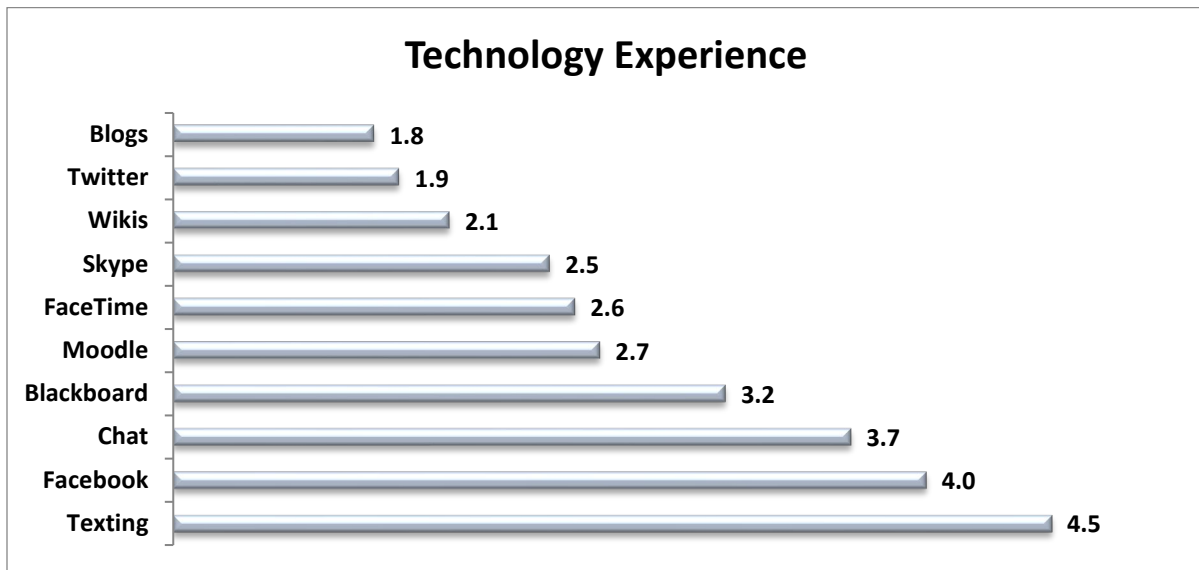
***Technology Experience***

Anticipating that access to and experience with online technology would likely affect online persistence, positively for those who have the financial resources to purchase the technology, and negatively for those who could not. Costs would include hardware and monthly data plans. So, technology experience is likely related to income. Colonialism resulted in generations of poverty for Indigenous communities in Canada and many current Indigenous university students come from families with limited financial resources. Regardless, our interest here was to learn about the technology experience of

Indigenous students and directly about their technology experience to learn more about this important information. The students rated their technology experience on a scale from 1 (None) to 5 (Extensive) and the results are presented in Figure 5.

**Figure 5**

*Technology Experience*



*Note.* Students rated their technology experience on a scale from 1 (None) to 5 (Extensive).

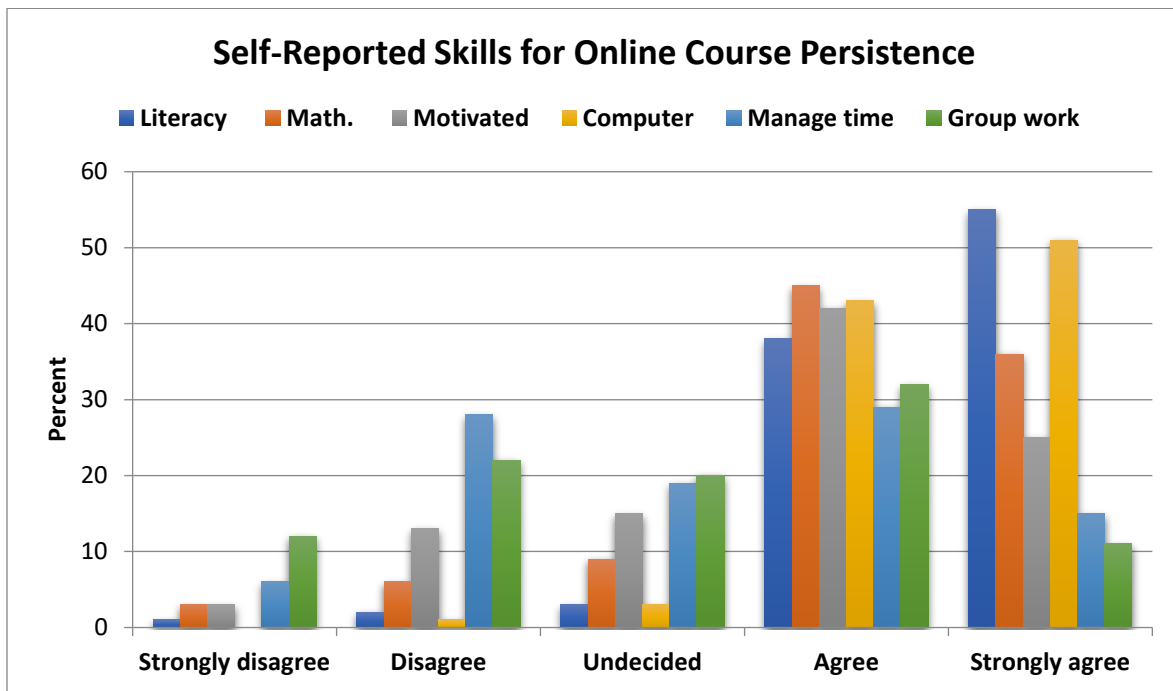
Figure 5 shows that most students had extensive experience with texting, Facebook or chat. Far fewer students had experience with blogs, Twitter, or Wikis.

### ***Self-reported Skills for Online Course Persistence***

Arguably there are a range of skills related to online course persistence. Our survey included questions on factors in the meta-analyses on online courses and items on topics raised by the Indigenous students who piloted the survey. Most survey items were related to computer skills, time management, and motivation. Our research on university persistence with face-to-face Indigenous at the same university (Walton et al., 2020) found that many students requested academic support, especially in the areas of mathematics and writing. The survey asked students to self-report their abilities in these areas (see Appendix A).

As Figure 6 shows, most Indigenous students reported having all of the skills they needed to complete online courses, with the exception of time management. Fifty percent of the students reported that they did not have the time management skills to complete online courses.

**Figure 6**  
*Self-Reported Skills for Online Course Persistence*



*Note.* Responses based on a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

***Supports and Barriers to Online Course Persistence***

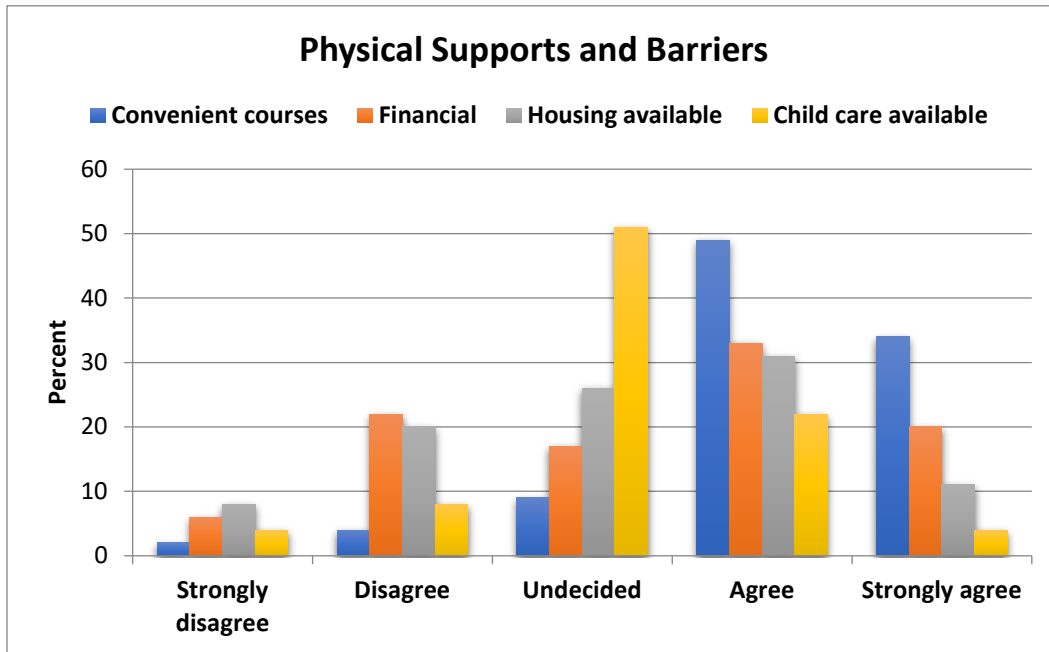
Online university course persistence arguably requires a range of financial, academic, and social supports. Indigenous university students in our recent research on the persistence identified the key supports and barriers they experienced at university (Walton et al., 2020). The items related to supports and barriers in the face-to-face survey were included in the online survey developed for the research presented here, with an additional item related to computer skills.



The findings are organized under those related to physical supports and barriers (see Table 1) and related to family, tutoring, non-academic, and technical support.

**Figure 7**

*Physical Supports and Barriers*



*Note:* Responses based on a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

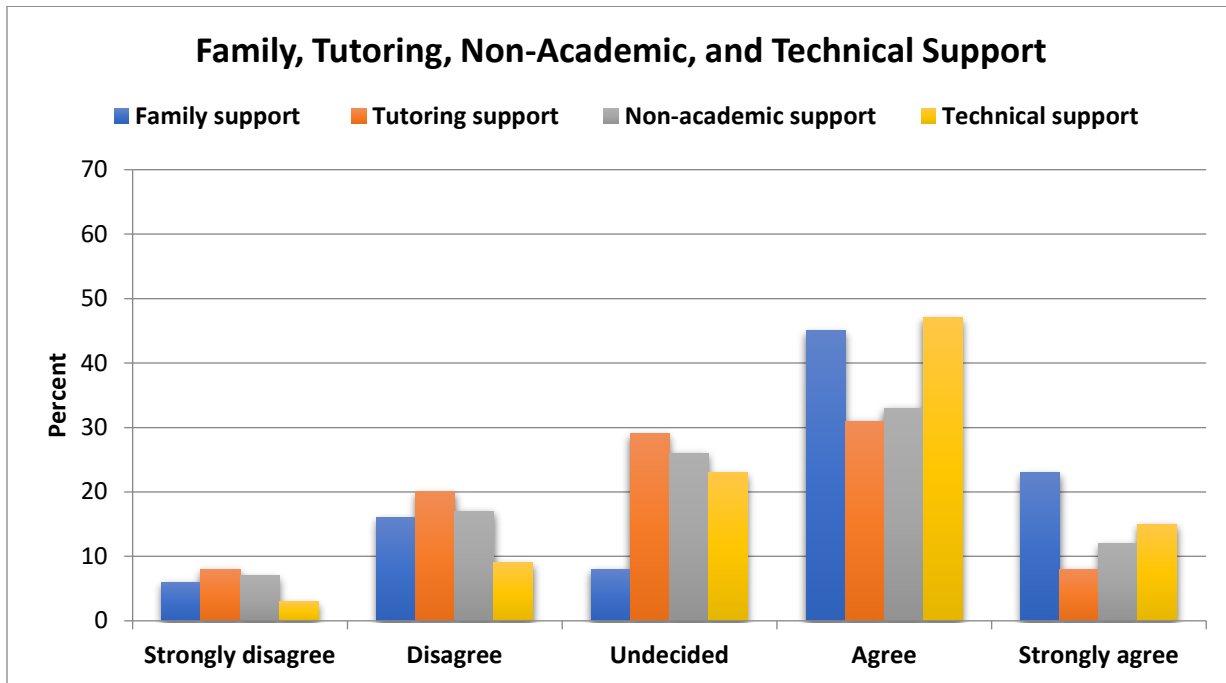
Figure 7 shows that 30% of Indigenous students did not have the financial support they needed to complete online courses, 30% reported that housing was not available, and 15% indicated that childcare was not available. Most students found that online course times were convenient, and they had the financial, housing, and childcare support that they needed.

Figure 8 shows that the majority of the Indigenous students received the family, tutoring, non-academic and technical support that they needed to complete online courses.

However, 15% of students reported that they did not have family support, 15% did not have tutoring, 20% did not have non-academic support, and 10% did not have technical support. Student interviews revealed that 25% of students requested tutoring support in mathematics or writing.

**Figure 8**

*Family, Tutoring, Non-Academic, and Technical Support*



*Note.* Responses based on a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree).

In addition to the surveys, students were asked in the interviews to identify supports that would increase online course persistence. The most common supports requested by the Indigenous students as additions or increases in online courses were for more face-to-face components (including with the professor), more Indigenous course content, and more online virtual environments and tools.

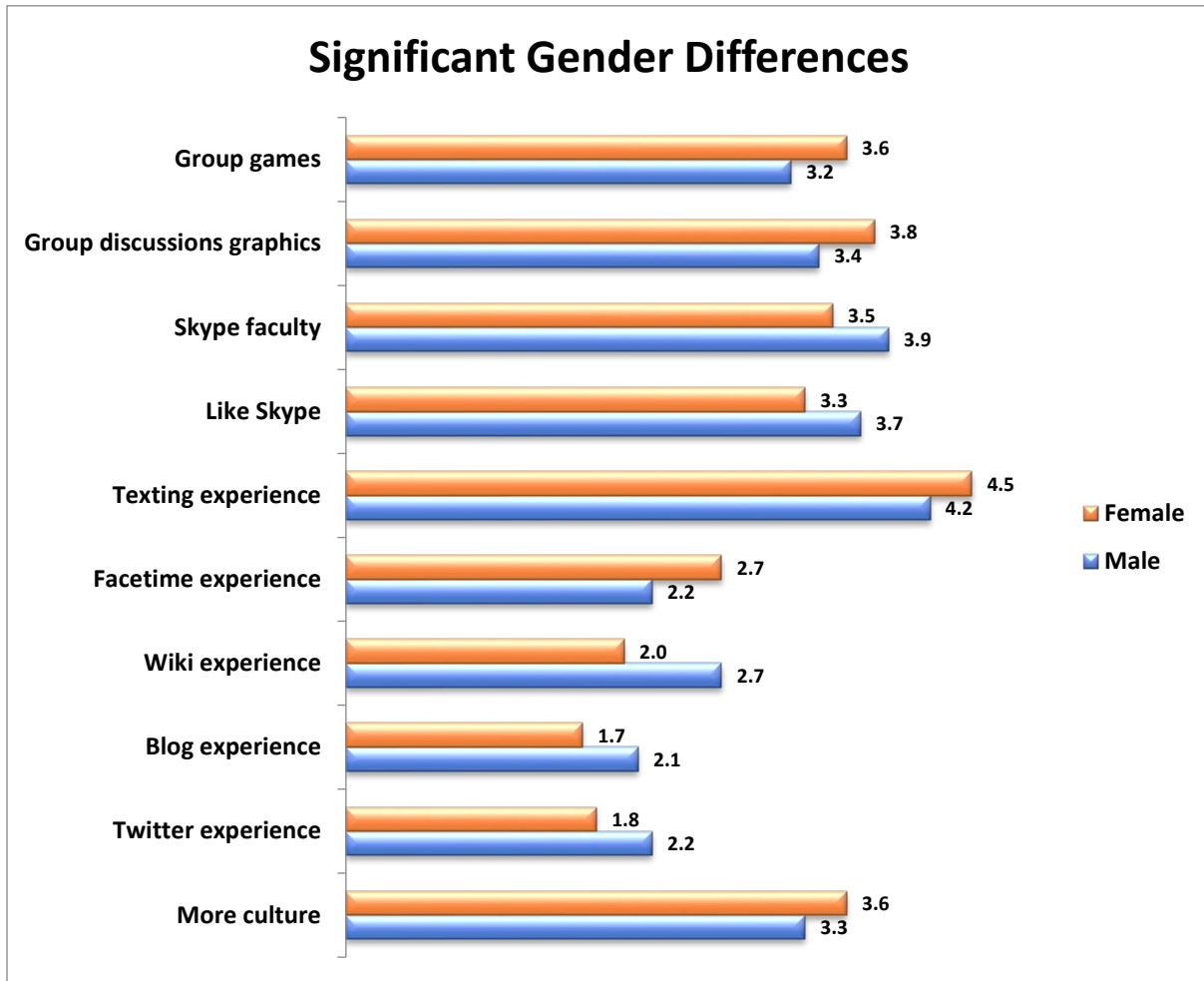
### ***Gender Differences***

The sample size of 212 was large enough to do statistical analyses to examine potential gender differences in the survey findings. The survey had 81 items in total and independent *t*-test analyses ( $p < .05$ ) found that there were significant gender differences for 10 items. That number of significant gender differences was over double the number that could be due to chance alone, which would be four items at the  $p < .05$  level.

Specifically, the binomial probability of observing 10 or more significant findings out of 81

with  $p = .05$  was  $.005$ . This result strengthened the support for the findings presented in Figure 9.

**Figure 9**  
*Significant Gender Differences*



Interestingly, females texted more than males but they both used texting a great deal. Males preferred Skype more than females and understandably, including with faculty. Overall, there was no consistent pattern across the gender differences.

**Four-Component Model of Online Persistence**

The research up to this point focussed specifically on the persistence supports and barriers of Indigenous students taking online courses. There were 18 survey items, each one

assessing a separate support or barrier related to one of the four components from the Indigenous model (social, cognitive, physical, cultural). A goal of the research was to identify the factors that had the most influence on persistence, and an exploratory factor analysis (EFA) could potentially reduce the number of factors from 18 (one for each survey item) to a smaller number of key factors.

EFA determines if there are significant groups of items that are highly related to each other (i.e., clusters), orders the factors by how much variance is explained, and identifies the survey items related to the factors. An exploratory factor analysis was conducted with the 18 support and barrier survey items on online persistence and the rotated factor matrix is presented in Table 1.

The sample included 212 students, 189 with complete data, a requirement for factor analysis. Many of the 23 students dropped from the analysis for incomplete data had not responded to the survey item on childcare. An error analysis of the missing data found systematic error related to the childcare item (e.g., participants who had not responded to that survey item may not have had children). The childcare item was not included in the EFA for those reasons.

Polychoric correlation is advised in EFA over Pearson correlation when the univariate distributions of ordinal items are asymmetric or when the data was collected with a Likert scale of five items or less (Baglin, 2014; Lorenzo-Seva et al., 2011). Polychoric correlations were used in the EFA as the online survey used a five item Likert scale, and two items had kurtosis values greater than 3.00. There is also controversy in the EFA literature on determining the number of significant factors. Recent summaries on this topic found that Eigenvalues (i.e.,  $> 1$ ) are most commonly used in the literature but tend to overestimate the number of significant factors, and parallel analysis is preferred over scree plots due to the subjectivity in reviewing scree plots (Garrido et al., 2013). All three methods of

determining the number of significant factors are reported as well as the amount of significance accounted for by each factor.

Suhr (2006) and Pett et al. (2003), argued that determining the number of factors to retain in factor analysis should be based on the interpretability in the context of the research. Keeping more factors than are needed is less detrimental than eliminating those factors. However, retaining too many factors can weaken the solution as it adds more factors. Regarding the selection of the number of factors to retain in the EFA, the parallel analysis supported three factors, as did the scree plot. Eigenvalues ( $> 1.00$ ) supported the interpretation of six factors. Following Suhr (2006) and Pett et al. (2003), the findings of four EFA factors are reported.

Table 1 reports the factor loadings identified by the EFA, with the significant loadings in bold (i.e., factor loadings  $> .45$ ). The correlation matrices of the items and the EFA factors, and the descriptive statistics are presented in appendices B, C, and D.

### *Factor Loadings (Variance Explained)*

**Table 1**

*Rotated Factor Matrix of Support and Barriers of Online Persistence*

<b>Survey Item</b>	<b>Cultural (28.8%)</b>	<b>Social (10.8%)</b>	<b>Cognitive (9.3%)</b>	<b>Physical (7.2%)</b>
Courses at convenient times	0.00	0.26	0.33	0.26
Finance support sufficient	0.08	-0.05	0.00	<b>0.58</b>
Housing available	0.02	-0.11	-0.06	<b>0.69</b>
Had family support	-0.05	0.04	0.18	<b>0.48</b>
Tutoring available	-0.14	0.08	0.13	0.30
Non-academic support available	0.04	0.05	-0.03	<b>0.46</b>
Technical support available	-0.14	0.13	0.32	0.29
Have literacy skills needed	0.01	0.21	<b>0.88</b>	-0.02
Have mathematics skills needed	-0.07	0.04	<b>0.77</b>	-0.09
Have motivation to complete	-0.02	<b>0.69</b>	0.21	-0.18
Have computer skills needed	0.08	-0.09	<b>0.90</b>	-0.03
Organize my time well	-0.03	<b>0.76</b>	-0.06	-0.17
Like group work	0.30	0.05	-0.12	0.06
Courses were positive socially	0.08	<b>0.71</b>	-0.10	0.07
Good relationships with faculty	-0.07	<b>0.55</b>	0.09	0.10
Good relationships with students	0.10	<b>0.63</b>	-0.17	0.17
Have Indigenous online faculty	<b>0.82</b>	0.02	0.12	-0.04
Have more Indigenous culture	<b>0.75</b>	0.01	0.00	0.03

*Note.* Loadings of factors included in the four-component model are in bold.

The EFA effectively reduced the number of items related to online persistence and identified the most influential items under each of the four components (cultural, social, cognitive, physical). Also, the EFA results support the use of the four-component model in this research. The findings on the key supports and barriers and organized under the four-component Indigenous model in the study is presented in Figure 10. The findings support a wholistic and intersectional Indigenous model that includes social, cognitive, physical, and cultural components. Figure 10 identifies the most influential supports and barriers related to Indigenous online university persistence, and so represents a potential starting point for organizations seeking to increase persistence.

**Figure 10**

*Four-Component Model of Indigenous University Student Online Persistence*



## Discussion

### Supports and Barriers

The findings support a four-component model of online Indigenous university persistence that includes cultural components, social factors, cognitive factors, and physical issues.

The findings recognize the intersecting impacts of academic issues such as academic support, with poverty-related stressors and obstacles such as finances, childcare needs, and housing. Also, cultural supports such as Indigenous cultural and ceremonial activities intersected with social engagement with university faculty, staff, and other students.

**Social components.** Most Indigenous online students reported good relationships with faculty and other students, but many courses had not created positive social environments. Using collaborative software and email from faculty were identified as the best online ways to increase engagement with faculty, and using Facebook, Skype or FaceTime were the least important. Quick responses for information and explanation were also selected as important factors to increase student to faculty engagement. Students reported that using more social media and virtual environments would enhance student to student engagement. Surprisingly, group projects often worked against engagement if each group member was assigned the same mark for the project. Individual accountability for the group project could potentially moderate this negative effect on group cohesion. Indigenous students reported in the interviews that having international students in online courses could enhance student relationships.

**Cognitive Components.** Most students reported that they had the literacy, mathematics, and computer skills needed to complete their courses but still 25% of students needed tutoring support in mathematics or writing.

**Physical Components.** Most students found that online course times were convenient. However, 30% of Indigenous online students reported that they did not have the financial support or housing needed to complete online courses. The most important supports identified by Indigenous students were to add a face-to-face component to online courses, include Indigenous course content, and use online virtual environments and tools.



**Cultural Components.** The cultural component in the EFA explained the most variance of the four components. Students said that having more Indigenous faculty teaching online courses at the university would increase engagement with faculty and provide Indigenous role models. Students also linked more Indigenous ceremonies and activities at the university with increased Indigenous faculty.

An Indigenous community in the lower mainland of BC had very high online university course completion rates (82%). Those online students met face-to-face weekly and academic tutoring and childcare were provided. This finding converged with the survey and interview results of Indigenous online students where childcare, academic tutoring, and face-to-face meetings were identified as important supports by those students (see Figure 10).

### ***Online Course Design Preferences***

Regarding online course design preferences, Indigenous students would like to have more virtual environments and Indigenous content in online courses. They least preferred audio and video instructor lectures.

Males preferred to use Facebook to connect with other students and received more non-academic support than females. Females preferred to use chat and FaceTime more than males and reported that course times were more convenient for them than for males.

There were several significant gender differences across a range of topics in the survey but we could not identify a systematic pattern.

### ***Face-to-Face and Online Indigenous University Persistence***

The findings taken together supported a wholistic Indigenous human model that include intersecting social, cognitive, physical, and cultural components. The survey used in this research with online learning with Indigenous university students was based on a survey created for Indigenous students taking face-to-face courses and included most of the same

survey items (Walton et al., 2020). Interestingly, most of the key supports and barriers for the online students were the same as for the face-to-face Indigenous students (i.e., more Indigenous faculty, financial support, good faculty relationships).

### ***From Research to Practice***

The research presented here identifies specific online teaching and learning practices that could potentially improve the persistence of Indigenous students. The implementation of the findings into the practice of online teaching with Indigenous students represents a new field of endeavor. Initial research in this area has focused on integrating online learning successfully into the existing practices, beliefs, experiences, and values of Indigenous learners (McMahon et al., 2019; Pulla, 2017) and recognizing the importance of traditional knowledge (Doering, 2014). Digital storytelling has emerged as a way to incorporate Indigenous knowledge into learning (Loewen et al., 2018) who also recognized the importance of including Indigenous knowledge holders and community members in the online course design process.

Finally, the participating university initiated an Indigenous mentoring project with undergraduate Indigenous students and faculty that facilitates writing, publishing, and social engagement.

## References

- Agreda Montoro, M, Ortiz Colón, A. M., Rodríguez Moreno, J. & Steffens, K. (2019). Emerging technologies. Analysis and current perspectives. *Digital Education Review*, 35, 186–210. <https://eric-ed-gov.ezproxy.tru.ca/?id=EJ1220161>
- Allen, E. & Seaman, J. (2013). *Changing course: Ten years of tracking online education in the United States*. Pearson.
- Archibald, J., Selkirk, Bowman, S., Pepper, F., Urion, C., Mirenhouse, G., & Shortt, R. (1995). Honouring what they say: Postsecondary experiences of First Nations graduates. *Canadian Journal of Native Education*, 21, 1–247. <https://eric.ed.gov/?id=ED399100>
- Arnouse, M. (2009). Personal communication.
- Berger, J., Motte, A., & Parkin, A. (2007). *The price of knowledge: Access and student finance in Canada* (3rd ed.). Canada Millennium Scholarship Foundation.
- Baglin, J. (2014). Improving your exploratory factor analysis for ordinal data: A demonstration using FACTOR. *Practical Assessment, Research and Evaluation*, 19, 1–15. <https://doi.org/10.7275/dsep-4220>
- Cochrane, J. E. & Maposa, S. (2018). How to ensure academic success of Indigenous students who 'Learn where they live.' *International Journal of E-Learning & Distance Education*, 33(2), 1–23. <http://www.ijede.ca/index.php/jde/article/view/1099>
- Corry, M., Ianacone, R. & Stella, J. (2014). Understanding online teacher best practices: A thematic analysis to improve learning. *E-Learning and Digital Media*, 11, 593–607. <https://doi.org/10.2304/elea.2014.11.6.593>
- Doering, A. (2014). Designing for learning engagement in remote communities: Narratives from North of Sixty. *Canadian Journal of Learning and Technology*, 4. <https://doi.org/10.21432/T2WC7H>
- Doering, A., & Henrickson, J. (2014). Designing for learning engagement in remote communities: Narratives from North of Sixty / Concevoir pour favoriser la participation active à l'apprentissage dans les communautés éloignées?: récits d'Au nord du soixantième parallèle. *Canadian Journal of Learning and Technology / La Revue Canadienne de l'apprentissage et de La Technologie*, 40(3). <https://doi.org/10.21432/T2WC7H>
- Fahy, P., & Steel, N. (2011). Attracting, preparing, and retaining under-represented populations in Rural and Remote Alberta-North communities. *Frontiers in Open and Distance Learning in the North*, 12(4)(May). <https://doi.org/10.19173/irrodl.v12i4.936>

- Fahy, P., Steel, N., & Martin, P. (2009). Preferences of residents in four Northern Alberta communities regarding local post-secondary programming. *International Review of Research in Open and Distance Learning*, 10(3), 17. <https://doi.org/10.19173/irrodl.v10i3.673>
- Farrel, D., Ray, K., Rich, T., Suarez, Z., Christenson, B., & Jennigs, L. (2018). A meta-analysis of approaches to engage social work students online. *Journal of Teaching in Social Work*, 38, 183–197. <http://dx.doi.org.ezproxy.tru.ca/10.1080/08841233.2018.1431351>
- Garrido, L.E., Abad, J.J. & Ponsoda, V. (2013) A new look at Horn's parallel analysis with ordinal variables. *Psychological Methods* 18(4), 454–474. <https://doi.org/10.1037/a0030005>
- Human Resources and Development Canada. (2006). *Learning-educational attainment*. <http://www4.hrsdc.gc.ca/.3ndic.1t.4r@-eng.jsp?iid=29>
- Institutional Planning and Analysis. (2009). IPA Baccalaureate Retention Fall09. Thompson Rivers University.
- Kawalilak, C. Wells, N., Connell, L. & Beamer, K. (2012). E-learning access, opportunities, and challenges for aboriginal adult learners located in rural communities. *College Quarterly*, 15(2), 1. <https://eric.ed.gov/?id=EJ979430>
- Loewen, J., Kinshuk, & Suhonen, J. (2018). I-DIGEST framework: Towards authentic learning for indigenous learners. *Smart Learning Environments*, 5(1), 4. <https://doi.org/10.1186/s40561-018-0053-2>
- Lorenzo-Seva, U., Timmerman, M. E., & Kiers, H.A.L. (2011). The Hull method for selecting the number of common factors. *Multivariate Behavioral Research*, 46, 340–364. <https://doi.org/10.1080/00273171.2011.564527>
- McMahon, T. R., Griese, E. R., & Kenyon, D. B. (2019). Cultivating Native American scientists: An application of an Indigenous model to an undergraduate research experience. *Cultural Studies of Science Education*, 14(1), 77–110. <https://doi.org/10.1007/s11422-017-9850-0>
- Means, B., Toyama, Y., Murphy, R., Bakia, M. & Jones, K. (2009). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. U.S. Department of Education.
- Pett, M., Lackey, N. & Sullivan, J. (2003). *Making sense of factor analysis*. Sage Publications, Inc.
- Pidgeon, M. (2009). Pushing against the margins: Indigenous theorizing of "success" and retention in higher education. *Journal of College Student Retention*, 10(3), 339–360. <http://baywood.metapress.com>.
- Philpott, D., Sharpe, D., & Neville, R. (2009). The effectiveness of web-delivered learning with aboriginal students: Findings from a study in coastal Labrador. *Canadian Journal of Learning*

- and Technology / La Revue Canadienne de l'apprentissage et de La Technologie*, 35(3). <https://doi.org/10.21432/T2T01T>
- Pulla, S. (2017). Mobile learning and Indigenous education in Canada: A synthesis of new ways of learning. *International Journal of Mobile and Blended Learning*, 9(2), 39–60. <https://doi.org/10.4018/IJMBL.2017040103>
- Simon, J., Burton, K., Lockhart, E. & O'Donnell, S. (2014). Post-secondary distance education in a contemporary colonial context: Experiences of students in a rural First Nation in Canada. *The International Journal of Research in Open and Distance Education*, 15, 1–19. <https://doi.org/10.19173/irrodl.v15i1.1357>
- Suhr, D. (2006). Exploratory or Confirmatory Factor Analysis [conference session] SAS Users Group International Conference. Cary, NC: SAS Institute, Inc. <https://support.sas.com/resources/papers/proceedings/proceedings/sugi31/200-31.pdf>
- Tessaro, D., Restoule, J.-P., Gaviria, P., Flessa, J., Lindeman, C. & Scully-Stewart, C. (2018). The five R's for Indigenous online learning: A case study of the First Nations schools' principals course. *Canadian Journal of Native Education*, 40, 125–143. <https://tspace.library.utoronto.ca/handle/1807/91087>
- Thompson Rivers University. (n.d.). Open Learning - Indigenous TRU. Coyote Project. <https://www.tru.ca/indigenous/coyote.html>
- Truth and Reconciliation Commission of Canada (TRC). (2015). *Honouring the truth, reconciling for the future: Summary of the final report of the Truth and Reconciliation Commission of Canada*. [http://www.trc.ca/websites/trcinstitution/File/2015/Honouring\\_the\\_Truth\\_Reconciling\\_for\\_the\\_Future\\_July\\_23\\_2015.pdf](http://www.trc.ca/websites/trcinstitution/File/2015/Honouring_the_Truth_Reconciling_for_the_Future_July_23_2015.pdf)
- Walton, P. D., & Byrne, R. (2014). Developing an online survey to identify learning preferences of Indigenous online learners [Paper presentation]. International Academic Conference on Education and E-Learning, Prague, Czech Republic, August 2014.
- Walton, P. D., Hamilton, K., Clark, N., Pidgeon, M., & Arnouse, M. (2020). Indigenous university student persistence: Supports, obstacles, and recommendations. *Canadian Journal of Education/Revue Canadienne De l'éducation*, 43(2), 430-464. <https://journals.sfu.ca/cje/index.php/cje-rce/article/view/3975>
- Walton, P., Hamilton, K., Johnson, S., & Arnouse, M. (2010). *Why do Aboriginal students stay or leave Thompson Rivers University?* [Report prepared for Thompson Rivers University: Kamloops, BC]
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## Appendices

### Appendix A: Indigenous University Student Online Supports, Barriers, and Learning Preferences

The university and Indigenous community want to increase the success of Indigenous students taking online courses. Your stories and feedback can help us to improve Indigenous online learning experiences. Thank you for agreeing to participate. The survey and will take about 30 minutes and your responses will be kept confidential.

Thompson Rivers University wants to improve the success of Aboriginal students, and we are pleased that you have consented to be interviewed. Your stories are important to help us understand the Aboriginal student experience at university. Your responses will be kept confidential. Thank you for participating.

**Please circle the number below that best describes your view.**

#### Demographic Information

1. At what education institutions have you taken online or blended courses?  
\_\_\_\_\_
2. The online courses were: Individual untimed courses\_\_\_ Class semester courses\_\_\_ (please check)
3. What program are you enrolled in? \_\_\_\_\_
4. What year of your program are you in? \_\_\_\_\_
5. How many online courses have you or are you taking? \_\_\_\_\_
6. Current age: \_\_\_\_\_
7. Do you identify as: First Nations\_\_\_ Metis\_\_\_ Inuit\_\_\_ Non-Indigenous
8. Gender: Male \_\_\_ Female \_\_\_ Other \_\_\_
9. Where have you lived most of your life?  
Rural community\_\_\_ Urban community\_\_\_ Both about equally\_\_\_
10. Can you speak your Indigenous language? No\_\_\_ A bit\_\_\_ Some\_\_\_ Fairly well\_\_\_ Fluently\_\_\_  
(please check)
11. Can you write your Indigenous language? No\_\_\_ A bit\_\_\_ Some\_\_\_ Fairly well\_\_\_ Fluently\_\_\_  
(please check)
12. I have access to a computer or tablet at home. Yes\_\_\_ No\_\_\_
13. I have access to the Internet at home. Yes\_\_\_ No\_\_\_
14. I have a cell phone with a data plan. Yes\_\_\_ No\_\_\_



<b>Supports and Barriers:</b>					
Circle the number that best describes your experience if it applies to you.	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Undecided</b>	<b>Agree</b>	<b>Strongly Agree</b>
1. Online course times were convenient (e.g., after work)	1	2	3	4	5
2. I had the financial support I needed to succeed	1	2	3	4	5
3. Affordable housing was available to me	1	2	3	4	5
4. Childcare services were available to me	1	2	3	4	5
5. I had family support to complete online courses	1	2	3	4	5
6. Tutoring support was available	1	2	3	4	5
7. I had support with non- academic issues (e.g., family)	1	2	3	4	5
8. The available technical support provided met my needs	1	2	3	4	5
9. I have the literacy skills to complete online courses	1	2	3	4	5
10. I have the math skills to complete online courses	1	2	3	4	5
11. I am motivated to complete online learning courses	1	2	3	4	5
12. I have the computer skills to complete online courses	1	2	3	4	5
13. I organize my time well to complete online courses	1	2	3	4	5
14. I like working in a group with other students	1	2	3	4	5
15. Online courses were a positive social environment	1	2	3	4	5
16. I have or had good relationships with online faculty	1	2	3	4	5
17. I have or had good relationships with online students	1	2	3	4	5
18. It is important to have Indigenous online faculty	1	2	3	4	5
19. More Indigenous cultural activities would help	1	2	3	4	5

<b>Technology Experience:</b>	<b>None</b>	<b>Some</b>	<b>A Lot</b>	<b>Extensive</b>
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Circle your level of experience using the following.		<b>Very Little</b>				
20. Facebook	1	2	3	4	5	
21. Twitter	1	2	3	4	5	
22. Blogs	1	2	3	4	5	
23. Wikis	1	2	3	4	5	
24. Skype	1	2	3	4	5	
25. FaceTime	1	2	3	4	5	
26. Chat (instant messaging)	1	2	3	4	5	
27. Text messaging on a cell phone	1	2	3	4	5	
28. Blackboard	1	2	3	4	5	
29. Moodle	1	2	3	4	5	

<b>Engagement:</b> Circle the importance of each item to complete online courses.	<b>Not Important</b>	<b>Very Little</b>	<b>Somewhat Important</b>	<b>Very Important</b>	<b>Extremely Important</b>
30. Interact online with students	1	2	3	4	5
31. Work on group projects	1	2	3	4	5
32. Email to communicate with other students	1	2	3	4	5
33. Chat to communicate with other students	1	2	3	4	5
34. Telephone to communicate with students	1	2	3	4	5
35. Video (e.g., Skype) to communicate with students	1	2	3	4	5
36. Discussion tool in BlackBoard or Moodle to communicate with other students	1	2	3	4	5
37. Face-to-face communication with other students	1	2	3	4	5
38. Email to communicate with instructors	1	2	3	4	5

39. Face-to-face communication with instructors	1	2	3	4	5
40. Indigenous course content	1	2	3	4	5
41. Same online design for all courses	1	2	3	4	5
42. Due dates similar to face-to-face courses	1	2	3	4	5
43. Project oriented assignments	1	2	3	4	5
44. Recorded video lectures from my instructor	1	2	3	4	5
45. Recorded audio lectures from my instructor	1	2	3	4	5
46. Graphics and photos to explain difficult concepts	1	2	3	4	5
47. Interactive activities such as educational games	1	2	3	4	5

## Student-to-Student Engagement:

The following items ask about your preferences for online learning activities. Watch the short video clips describing each activity and then answer the questions below.

**Video 1:** Students using the text discussion tool in to engage with other students (e.g., BlackBoard)

([https://barabus.tru.ca/indigenous/indigenous\\_video1.html](https://barabus.tru.ca/indigenous/indigenous_video1.html))

Please circle the number that best describes your view:	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
48. I would like to use an online text discussion tool.	1	2	3	4	5
This activity would help me to:					
49. participate in group discussions	1	2	3	4	5
50. build relationships with other students	1	2	3	4	5
51. support other students in their learning (e.g., writing)	1	2	3	4	5
52. work hard to complete the course	1	2	3	4	5

**Video 2:** Students are engaging with other students in social media discussions (e.g., Facebook).

([https://barabus.tru.ca/indigenous/indigenous\\_video2.html](https://barabus.tru.ca/indigenous/indigenous_video2.html))

Please circle the number that best describes your view:	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
53. I would like to use online social media.	1	2	3	4	5
This activity would help me to:					
54. participate in group discussions	1	2	3	4	5
55. build relationships with other students	1	2	3	4	5
56. support other students in their learning (e.g., writing)	1	2	3	4	5
57. work hard to complete the course	1	2	3	4	5

**Video 3:** Students are interacting with other students in a 3-D virtual environment.

([https://barabus.tru.ca/indigenous/indigenous\\_video3.html](https://barabus.tru.ca/indigenous/indigenous_video3.html))

Please circle the number that best describes your view:	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
58. I would like to interact in a 3-D virtual environment.	1	2	3	4	5
This activity would help me to:					
59. participate in group discussions	1	2	3	4	5
60. build relationships with other students	1	2	3	4	5
61. support other students in their learning (e.g., writing)	1	2	3	4	5
62. work hard to complete the course	1	2	3	4	5

How could student-to-student engagement be increased in online courses?

## Student-to-Faculty Engagement

**Video 4:** A student is interacting with an instructor using collaborative software.

([https://barabus.tru.ca/indigenous/indigenous\\_video4.html](https://barabus.tru.ca/indigenous/indigenous_video4.html))

Please circle the number that best describes your view:	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
63. I would like to use collaborative software.	1	2	3	4	5
This activity would help me to:					
64. participate in group discussions	1	2	3	4	5
65. build relationships with other students	1	2	3	4	5
66. support other students in their learning (e.g., writing)	1	2	3	4	5
67. work hard to complete the course	1	2	3	4	5

**Video 5:** A student is interacting with their instructor using a video communication tool such as Skype or FaceTime. ([https://barabus.tru.ca/indigenous/indigenous\\_video5.html](https://barabus.tru.ca/indigenous/indigenous_video5.html))

Please circle the number that best describes your view:	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
68. I would like to use Skype or FaceTime.	1	2	3	4	5
This activity would help me to:					
69. build a relationship with the instructor	1	2	3	4	5
70. work hard to complete the course	1	2	3	4	5

**Video 6:** A student is interacting with their instructor using chat in a social media tool such as Facebook. ([https://barabus.tru.ca/indigenous/indigenous\\_video6.html](https://barabus.tru.ca/indigenous/indigenous_video6.html))

Please circle the number that best describes your view:	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
71. I would like to use Facebook in online courses.	1	2	3	4	5

This activity would help me to:					
72. build a relationship with the instructor	1	2	3	4	5
73. work hard to complete the course	1	2	3	4	5

How could student-to-faculty engagement be increased in online courses?

## Engagement with Content

**Video 7:** A student is shown reading and watching content with embedded graphics, audio, and video media. ([https://barabus.tru.ca/indigenous/indigenous\\_video7.html](https://barabus.tru.ca/indigenous/indigenous_video7.html))

Please circle the number that best describes your view:	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
74. I would like to have embedded media in online courses	1	2	3	4	5
This activity would help me to:					
75. participate in group discussions	1	2	3	4	5
76. build relationships with other students	1	2	3	4	5
77. support my learning (e.g., writing)	1	2	3	4	5
78. work hard to complete the course	1	2	3	4	5

**Video 8:** A student is shown interacting with content through interactive games.

([https://barabus.tru.ca/indigenous/indigenous\\_video8.html](https://barabus.tru.ca/indigenous/indigenous_video8.html))

Please circle the number that best describes your view:	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
79. I would like interactive games in online courses	1	2	3	4	5
This activity would help me to:					
80. participate in group discussions	1	2	3	4	5
81. build relationships with other students	1	2	3	4	5
82. support my learning (e.g., writing)	1	2	3	4	5
83. work hard to complete the course	1	2	3	4	5

**Video 9:** A student is shown interacting with content in a virtual environment that is culturally related to the student. ([https://barabus.tru.ca/indigenous/indigenous\\_video9.html](https://barabus.tru.ca/indigenous/indigenous_video9.html))

Please circle the number that best describes your view:	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
84. I like cultural virtual environments in online courses	1	2	3	4	5
This activity would help me to:					
85. participate in group discussions	1	2	3	4	5
86. build relationships with other students	1	2	3	4	5
87. support my learning (e.g., writing)	1	2	3	4	5
88. work hard to complete the course	1	2	3	4	5

What interactive features would make online courses more interesting?

## **Interview Questions**

1. Please tell me your background story about how you came to be an online university student.
2. How did you find out about Thompson Rivers University online courses?
3. What were the best features of the online courses that you took?
4. What tutoring or academic support (e.g., writing, math.) would be helpful to complete online courses?
5. What activities in online courses would enhance your relationships with faculty?

6. What activities in online courses would enhance your relationships with classmates?

7. Are there online programs or degrees that you would want to take?

8. Did you complete your online courses? What were the barriers to learning online?

9. What supports would help Indigenous students to complete online courses?



**Appendix B: Correlations Between the Supports and Barriers of Persistence**  
**(N = 189)**

Factor	1	2	3	4	5	6	7	8	9
1. Courses at convenient times	-								
2. Finance support sufficient	.28***	-							
3. Housing available	.25***	.42***	-						
4. Had family support	.33***	.31***	.34***	-					
5. Tutoring available	.32***	.26***	.13	.19**	-				
6. Non-academic support available	.12	.21**	.19**	.40***	.21**	-			
7. Technical support available	.44***	.13	.19**	.35***	.39***	.24***	-		
8. Have literacy skills needed	.45***	.14*	.10	.33***	.29***	.16*	.47***	-	
9. Have mathematics skills needed	.45***	.16*	.03	.33***	.23***	.04	.35***	.67***	-
10. Have motivation to complete	.41***	.15*	.01	.30***	.16*	.13	.24***	.45***	.48***

Factor	10	11	12	13	14	15	16	17
11. Have computer skills needed	.47***	-						
12. Organize my time well	.69***	.28***	-					
13. Like group work	-.02	-.03	.08	-				
14. Courses were positive socially	.46***	.23***	.39***	.03	-			
15. Good relationships with faculty	.42***	.38***	.35***	-.14*	.44***	-		
16. Good relationships with students	.32***	.18**	.33***	.10	.52***	.48***	-	
17. Have Indigenous online faculty	.01	.08	.04	.22**	.12	.08	.17*	-
18. Have more Indigenous culture	.00	-.05	-.02	.24***	.14*	-.07	.08	.62***

Note. \*  $p < .01$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

### Appendix C: Correlations Between the Factors Identified in the EFA ( $N = 189$ )

Factor	1	2	3
1. Cultural component	-		
2. Social component	.03	-	
3. Cognitive component	-.13	.61***	-
4. Physical component	-.18**	.42***	.43***

Note. \*\*  $p < .01$ , \*\*\*  $p < .001$

### Appendix D: Descriptive statistics for Survey Items ( $N = 189$ )

Survey item	Mean	SD
Courses at convenient times	4.10	0.92
Finance support sufficient	3.33	1.22
Housing available	3.25	1.13
Had family support	3.60	1.19
Tutoring available	3.03	1.05
Non-academic support available	3.29	1.13
Technical support available	3.65	0.95
Have literacy skills needed	4.50	0.74
Have mathematics skills needed	4.10	0.99
Have motivation	3.73	1.10
Have computer skills needed	4.45	0.66

Organize my time well	3.17	1.20
Like group work	3.01	1.25
Courses were positive socially	2.96	1.07
Good relationships with faculty	3.40	1.12
Good relationships with students	3.04	0.99
Have Indigenous online faculty	3.80	0.99
Have more Indigenous culture	3.60	0.94

*Note.* Descriptive statistics for Survey Items (N = 189)

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