

**Supporting teacher activities and learning design in the online environment with learning analytics.**

**A faculty perspective.**

**By Marie Lippens**

A Thesis submitted to the Athabasca University governing council in partial fulfillment of the requirements for the degree of

**Master of Education**

Athabasca University

April 2017



The future of learning.

### Approval of Thesis

The undersigned certify that they have read the thesis entitled

**“Supporting teacher activities and learning design in the online environment  
with learning analytics. A faculty perspective.”**

Submitted by

**Marie Lippens**

In partial fulfillment of the requirements for the degree of

**Master of Education in Distance Education**

The thesis examination committee certifies that the thesis  
and the oral examination is approved

**Supervisor:**

Dr. George Siemens  
Centre for Distance Education  
Athabasca University

**Committee Member:**

Dr. Mohamed Ally  
Centre for Distance Education  
Athabasca University

**External Examiner:**

Dr. Xiaokun Zhang  
Faculty of Science and Technology  
Athabasca University

May 16, 2017

1 University Drive, Athabasca, AB, T9S 3A3 Canada  
P: 780.509-7536 | Toll-free (CAN/U.S.) 1.800.788.9041 (7536)  
[fgs@athabascau.ca](mailto:fgs@athabascau.ca) | [fgs.athabascau.ca](http://fgs.athabascau.ca) | [athabascau.ca](http://athabascau.ca)

DEDICATION

This work is lovingly dedicated to my husband Steve and my two children Adrina and Austin. It is their unwavering support over the past few years that has allowed me to get to where I am now. The experience had its challenges, as every worthy pursuit does. It also has great rewards not just for me but for the strength and resiliency of my entire family. I am forever transformed, and so my family and community is too.

ACKNOWLEDGEMENTS

A sincere thank you is extended to my thesis committee. Dr. George Siemens, my supervisor and Dr. Mohamed Ally, committee member, were instrumental in helping me focus my curiosity into a feasible project, and then in finding my voice to apply meaning to it all. You have helped me grow in many ways,

Thanks also to Dr. Cynthia Blodgett-Griffin for her encouraging words and experienced guidance that shaped this project in the first place.

To Mickey MacGregor, who helped me obtain the data I needed, which was no simple task. She went above and beyond, even on her holidays, to make sure that I had what I needed.

Finally, to the participants in my study, who shared their time generously and told their stories so openly. There would be no study without you.

### ABSTRACT

Teaching online requires careful planning, monitoring and reflection. Learning Analytics (LA) can help teachers observe, inquire and evaluate their practice. Still, LA is not widely adopted by online teachers towards this end. This mixed methods exploratory case study seeks the perspective of experienced faculty of online graduate studies to describe insights gained through LA. Course data was extracted from Moodle (the Learning Management System or LMS), and presented to faculty in several forms. Discourse analysis was also performed, grounded in the Community of Inquiry (CoI) model (Garrison, Anderson & Archer, 1999). Faculty were interviewed and asked to assign meaning and elaborate on several aspects of the data and its relationship with course design and teaching practice. Data from the courses represented user activity and the timing and extent of each of the CoI presences (social, cognitive and teaching). Findings indicate that engaging faculty in the quantitative and qualitative process of LA is a powerful way to assess course dynamics, link to theoretical grounding, contrast to faculty observations and perceptions, and engage faculty in a community of practice.

**Table of Contents**

LIST OF TABLES .....	x
LIST OF FIGURES .....	xi
LIST OF ABBREVIATIONS .....	xii
Chapter 1: Introduction .....	1
Purpose .....	2
Research Questions .....	4
Assumptions .....	4
Biases .....	4
Limitations .....	5
Delimitations .....	6
Definition of Terms .....	6
Chapter 2: Review of the Literature .....	9
Introduction .....	9
Interaction .....	10
Community of inquiry (CoI) .....	11
Learning design .....	12
Learning analytics .....	13
Guiding research .....	15
Summary of the State of Current Knowledge .....	18
Chapter 3: Methodology .....	19
The research design .....	19
Philosophical foundations of the mixed methods approach .....	19
Context of the proposed research .....	21
Sampling .....	21

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

Faculty.....	22
Courses.....	22
Data collection .....	22
Data analysis procedures.....	23
Validity .....	25
Chapter 4: Results.....	27
Preliminary Questionnaire .....	27
Quantitative Analysis.....	30
Learning design visualizations.....	30
Log hits as a proxy indicator of total presence.....	34
Classical content analysis of discussion forums.....	38
Qualitative Analysis.....	40
Data Usage.....	41
Data Representations .....	41
Teacher Practice.....	42
Course Design and Data Capture.....	43
Leadership and the Community of Inquiry.....	44
Technology Choice.....	46
Openness.....	46
Commitment to Excellence.....	47
Chapter 5: Discussion.....	50
Introduction.....	50
The Use and Form of Analytics Data .....	50
Learning design visualizations.....	51

# TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

Log Counts.....	52
Incomplete Data Capture .....	54
Discourse Analysis and the CoI.....	54
Insights Informing Teacher Practice.....	55
The Provision of Visualized Data to Faculty.....	56
Chapter 6: Conclusion.....	59
The Community of Inquiry.....	59
An Opportunity – Teacher Community of Practice.....	60
Summary of Recommendations.....	61
Practical applications.....	61
Future research.....	63
Leading the Future.....	63
References.....	65
Appendix A: Faculty Letter of Invitation.....	72
Appendix B: Letter of Information/Informed Consent Form.....	73
Appendix C: Ethics Approval Letter.....	77
Appendix D: Letter of Institutional Permission.....	78
Appendix E: Faculty Interview Plan.....	80
Appendix F: Telephone Interview Log Sheet.....	82
Appendix G: Preliminary Faculty Questionnaire.....	84
Appendix H: Faculty Questionnaire Responses.....	86
Appendix I: Community of Inquiry Coding Template.....	94
Appendix J: Course 1 Discussion Forum Analysis – Elements of the CoI.....	95
Appendix K: Course 2 Discussion Forum Analysis – Elements of the CoI.....	97



## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

Appendix L: Course 1 CoI Presence per User .....	99
Appendix M: Course 2 CoI Presence per User .....	105
Appendix N: Faculty 1 Interview Transcript .....	108
Appendix O: Faculty 2 Interview Transcript .....	125

LIST OF TABLES

Table 1: Faculty responses - sources of decision support for iterative course improvements....28

Table 2: Learning design of course 1 by weekly activity schedule.....30

Table 3: Learning design of course 2 by weekly activity schedule.....32

LIST OF FIGURES

Figure 1. Application of the Explanatory Sequential Mixed Methods Research Approach.....19

Figure 2. Logged course activity, by type, for Course 1, iteration 1 (18 Users) ..... 31

Figure 3. Logged course activity, by type, for Course 1, iteration 2 (16 Users) .....31

Figure 4. Logged course activity, by type, for course 1, iteration 3 (23 Users) ..... 31

Figure 5. Logged course activity, by type, for course 2, iteration 1 (13 Users) ..... 33

Figure 6. Logged course activity, by type, for course 2, iteration 2 (19 Users) ..... 33

Figure 7. Logged course activity, by user, for Course 1, iteration 1 ..... 34

Figure 8. Logged course activity, by user, for Course 1, iteration 2 ..... 35

Figure 9. Logged course activity, by user, for Course 1, iteration 3 ..... 35

Figure 10. Logged course activity, by user, for course 2, iteration 1 ..... 36

Figure 11. Logged course activity, by user, for course 2, iteration 2 ..... 37

Figure 12. Frequency trends of the CoI sub-elements for all iterations of Course 1 ..... 39

Figure 13. Frequency trends of the CoI sub-elements for all iterations of Course 2 ..... 40

LIST OF ABBREVIATIONS

CoI..... Community of Practice

EDM..... Educational Data Mining

LA..... Learning Analytics

LD..... Learning Design

LMS..... Learning Management System

M.ED..... Master of Education

## Chapter 1: Introduction

Today's technology has enormous capacity to collect and store data from the internet. The financial sector, insurance industry, marketing and health care industries are but a few examples in which so-called Big Data has transformed the way we operate. Data is used to detect, analyze and predict trends, issues and events of human behaviour so that industry can respond accordingly. The benefits are significant in being able to minimize risk better, identify gaps in services, and even create predictive models. Educational institutions have been slower to incorporate the use of available data, but progress has begun (Siemens & Long, 2011). Two related and overlapping fields have emerged in recent years, coined *educational data mining (EDM)* and *learning analytics (LA)*. They are both concerned with using data to advance understanding of learning and behaviours within learning environments. How this data is collected, managed, interpreted and used is still being explored in both research EDM and LA research fields.

Online educational systems have been compared to ecological models for their complexity and the necessity to adapt to the changing environment (Johnson & Cooke, 2016; Weller & Anderson 2013; Luckin, Clark & Underwood, 2013; Normak, Pata & Kaipainen, 2012). This comparison underlines the need for providers of online education to remain flexible in policy and quality efforts. Institution-wide directives often restrict thriving educational environments, limiting the crucial ability to adapt in response to contextually unique circumstances (Whitworth & Benson, 2010; Macfadyen & Dawson, 2012).

Student behaviour, or interaction patterns, in online courses is an active area of inquiry (Gašević, Dawson & Siemens, 2015). In order for learning to occur, students must be engaged in structured, systematic interaction (Fulford & Zhang, 1993; Roblyer & Wiencke, 2003). Garrison

and Cleveland-Innes (2005) demonstrated that engagement is a precursor for cognitive presence, which is required in any learning context. Online course design and delivery characteristics should guide students and therefore influence student interaction patterns (Kang, Liw, Kim & Park, 2014). Analysis of interaction data has the potential to assess alignment of course design and delivery with student learning outcomes in a particular context, (see, for example, Rodríguez-Triana, Martínez-Monés, Asensio-Pérez & Dimitriadis, 2015). Macfadyen and Dawson (2010) showed that when this data is available, it is possible to actively flag students who are not likely to succeed in a given course. Interaction data can also be used to inform the effectiveness and value of specific course/facilitation parameters (Mor, Ferguson & Wasson, 2015).

### **Purpose**

The basis for this study stems from the observation that online teachers are not widely and openly using learning analytics to inform their practice. This lack of adoption exists even though the literature supports the notion that LMS data can capture student interaction patterns that tell us a great deal about the unique dynamics of online courses. In response, this study seeks the faculty perspective from highly experienced teachers of successful online courses. In order to obtain this perspective, specific graduate-level online learning environments are explored for recorded activity and discourse patterns. The data is assessed according to relevant learning theory, which is the well-characterized Community of Inquiry (CoI) framework (Garrison, Anderson & Archer, 1999). Representations of the data summarized from the courses are then presented to the teachers of the courses. The teacher's interpretation and insights of this data and their experiences with their courses aim to describe the realities of data-driven teacher inquiry and data-informed learning design. The link between learning analytics, learning design and

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

teacher inquiry is explored with a sensitivity to contextual details that influence the process of data-driven quality improvement. The result is an exploration of data collected from online course interactions, linked to relevant learning theory, and an in-depth perspective from the teachers of these courses. Teacher perspective is framed as a reflection of experiences, observations and data used to support the decision making processes of their practice. This information can be used to gain insight and possible strategies to encourage teacher use of course data towards improving their practice and their courses. Mor, Ferguson and Wasson (2015) contend that “learning analytics offers a powerful set of tools for teacher inquiry, feeding back into improved learning design” (p. 221). Data collected throughout this study are used to reflect on this assertion. The three phases of this study are as follows:

- Phase 1: A preliminary study extracted current perspectives and practice of faculty regarding the use of learning analytics to improve their courses and their practice, including a look at the data available to them.
- Phase 2: Quantitative collection and analysis of LMS data was assessed according to activity patterns relative to course design. Discourse was analysed according to the CoI framework. This assessment was presented to faculty in simple graphical or tabular form.
- Phase 3: Follow-up qualitative inquiry obtained the faculty perspective on meaning and utility of the data, as well as course-specific insights, observations and strategies to promote student success.

Study design followed a mixed methods approach. The mixed methods approach provided a multi-dimensional perspective that is important for accurate capture of a complicated

topic with potentially unforeseen influences. Providing triangulation of data and method, the approach is ideally suited to support the validity of this exploratory case study.

### **Research Questions**

#### **Research Question 1:**

By engaging Faculty in the process of learning analytics, grounded in learning theory and learning design concepts, what insights and actionable items are identified?

#### **Research Question 2:**

How do faculty perceive learning analytics to inform ongoing course design/delivery decisions? What are the opportunities and challenges?

### **Assumptions**

Engaging experienced online faculty in the use of learning analytics in the context of their courses is assumed to provide a practical and practice-oriented perspective to the field. Additionally, it is assumed that experienced faculty have a long history of teaching experiences and an evolving practice on which to reflect. As faculty in this study have been teachers for more than 20 years, and have been teaching online for more than 15 years, their experience is extensive. It is also assumed that faculty are aware of and can discuss learning theory as it relates to their practice and course design. This assumption is rooted in the fact that faculty in this study are subject matter experts and teachers on the topic of learning theory.

### **Biases**

As a teacher and a scientist, the author acknowledges her biases as a practitioner and student of the topic researched. Careful steps have been taken to avoid projecting these biases onto study participants or data interpretation. First, the preliminary questionnaire was pre-tested on colleagues and feedback was used to optimize respondents' ability to understand and provide



## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

a clear and open answer to each question. Second, quantitative data analysis was conducted to include the complete course data set and discourse analysis was conducted and quantified according to the pre-established and validated [Community of Inquiry coding template](#) (Garrison et al, 2000). A pre-developed interview plan was used to guide interview discourse. The interview plan consisted of an overview of the study, instructions provided to respondents, questions asked and strategies to encourage respondents to give further details. A telephone interview log sheet was used for each telephone interview where notes, themes and impressions were recorded. The sheets were completed within 24 hours of each interview. Themes were extracted from interviewees' responses and interview transcripts were systematically coded. As much as possible, direct quotes are used to describe and discuss findings. Results were also shared with participants as a confirmatory measure to ensure interpretation was not unduly influenced by researcher biases. In general, findings are carefully grounded in the quantitative and qualitative data collected, and connected to relevant literature where possible.

### **Limitations**

The study is limited by available data in the courses under study. Only data captured and logged by the LMS is available for use in the learning analytics process. Students and teachers engage in course activity outside of the LMS as well. This is a common limitation of learning analytics research in general. Learning is a process that does not stop when one logs out of an LMS for the day. Kitto, Cross, Waters & Lupton (2015) demonstrated the need to move beyond simply collecting data logged by the LMS, and incorporated social media information as well. There still exist many barriers to this kind of data access from an ethics and privacy standpoint, and so most teachers are not able to access such a broad spectrum of data on their students'

activities. This study asks teachers to qualitatively describe activity that they engage in that occurs external to the LMS.

### **Delimitations**

The study is delimited to courses and faculty within the Master of Education program at an online university. Results of this study will not directly apply to other contexts, but rather serve as an example and/or guide to exploration within other contexts.

### **Definition of Terms**

The following operational definitions are used in this thesis project:

**Online learning** in this study refers to a formal academic learning experience in which students and teacher are separated by space and time. Course content and activities are made available through an online LMS. Students access this system, synchronously or asynchronously to learn from their location via an internet connection.

**Learning analytics (LA)** is the “measurement, collection, analysis, and reporting of data about learners and their contexts, for the purposes of understanding and optimizing learning and the environments in which it occurs” (Siemens 2013). In this project, the process of learning analytics will be applied to collected traces that are left behind in the context of individual online courses. This data will be used to explore course design and teacher inquiry. LA uses analytics methods such as social network analysis, discourse analysis, process mining, topic modeling, and learning design assessment.

**Learning design (LD)** is the application of a teacher’s knowledge of instructional design, pedagogy and best practices to develop or improve a unit of learning.

**Teacher inquiry** is the ongoing observational and reflective practice that a teacher uses to improve their practice and courses.

**Learning Management System (LMS)** is a software application used to administer, deliver, document and track online courses. In this study, the LMS functionality is provided through the open source learning platform, Moodle.

**Interaction patterns** that will be obtained in this study are logged in the LMS of the online courses in this study. Logged data includes student and teacher actions and discourse within the confines of the course structure.

**Community of inquiry (CoI).** In the context of graduate level online learning, a collaborative-constructivist model applies, which is Garrison, Anderson and Archer's (2000) Community of Inquiry Model. The model defines a CoI as "a group of individuals who collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding" (Garrison 2011). This model outlines the development of a deep and meaningful learning experience through three interdependent elements. These elements are social presence, cognitive presence and teaching presence.

**Social presence** is the element that indicates social or emotional connections are taking place, and that participants are expressing themselves as "real people" (Garrison et al, 2000). Three categories defined within this element are:

- Emotional expression, such as the use of emoji's and other indicators of emotion evident within the discourse
- Open communication, such as "risk-free expression" (Garrison et al, 2000), and the sharing of personal information, experiences and anecdotes
- Group cohesion, such as collaborative connections and evidence of shared effort and camaraderie.

**Cognitive presence** indicates thoughtful and deliberate efforts to learn and understand by communicating within the group. Four categories defined within this element are:

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

- Triggering event, such as a sense of puzzlement or unknown factor needing information
- Exploration, such as sharing of information and resources related to a topic
- Integration, which involves connecting what is being learned to another idea or personal experience
- Resolution, which takes what was learned and applies it to something entirely new

**Teaching presence** is the presentation of information, direction and guidance to the student group or individuals. Three categories defined within the element are:

- Instructional management, such as the definition of goals and topics of discussion and initiating dialogue
- Building understanding, such as elaborating on a topic using real-world examples or sharing personal meaning
- Direct instruction, such as re-directing or focusing discussion and other activities

**Support** is used to describe a teacher's efforts to guide, encourage or otherwise aid student(s) in their academic pursuits within a given online course.

**Educational data mining (EDM)** uses “large-scale educational data sets to better understand learning and to provide information about the learning process” (Romero, Ventura, Pechenizkiy & Baker, 2010, p.1).

## Chapter 2: Review of the Literature

### Introduction

This study is centred on teachers' perceptions of the application of learning analytics, and how it may be used to improve their courses and practice. To achieve data-informed decision support, LMS data can be used to discern student interaction patterns and relate these patterns to learning design and teacher inquiry efforts. Although learning analytics is a relatively young field, the concepts applicable to this exploratory study are well established. They involve the theory and principles of interaction, community of inquiry and learning design.

Providers of online education battle a lingering stigma of inferior quality (Gaskell & Mills, 2014). In order to shake off this historical bias, online educators must be vigilant and cognizant of quality issues at all times. The ecological model of online education systems highlights the need to continually evolve along with the dynamic social, technological and economic environments. In doing so, there is an ensuing promise that institutions will survive and thrive in these competitive and changing times (Moore & Kearsley 1996). Towards this goal, efforts have been made on every level. Professional development of online teachers has become prominent in the area of *teacher inquiry*, in which teachers share their experiences with peers and engage in reflective activities to strengthen their practice (Penick & Harris, 2005). Time and attention have also been dedicated to *learning design* (Mor, Craft & Hernandez-Leo, 2013), with the goal of creating engaging, positive learning environments by choosing appropriate tools, resources and structural elements to best promote learning (Koper & Tattersal, 2005). Technology has opened up the doors for a field of expertise known as *learning analytics* (Siemens, 2013; Gašević et al, 2015). Learning analytics harnesses available data from online learning activity to better understand the teaching and learning process. Mor et al (2015)

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

advocate for the integration of these three separate fields. They argue that a synergistic relationship can exist between them where stakeholders can see, both actively and reflectively how the teacher's role, course design and student activities align. Macfadyen and Dawson's (2012) study on institutional data usage points to the need for analytics to be made available to those motivated and able to drive change at all levels. Data-driven decision-making has become indispensable in other sectors and Siemens and Long (2011) argue that educational institutions must take action in this direction.

### **Interaction**

John Dewey (1938) identified the concept of educational interaction as an action which results in the generation of ideas about the external world. These ideas are then communicated and knowledge is constructed and confirmed (Garrison & Anderson, 2003). Roblyer and Wiencke (2003) developed a rubric for evaluating degrees of interactivity in distance learning courses. They describe interactions as social, instructional, technological, learner driven and instructor driven, and are detailed in a five-level hierarchy of interactive quality from low to high. Anderson's (2003) equivalency theorem points out that one would not expect all types of interaction to be encouraged at the highest level in a given course context, as it would not be efficient or necessary for learning. What this rubric does is highlight the mosaic of possible interactions in an online learning environment. It has the potential to serve as an indicator of the success of specific course dynamics as a prospective or retrospective exercise. With some refinements, it may form a basis for a link between learning theory and interaction patterns by providing a characteristic stamp for each of many learning approaches.

### **Community of inquiry (CoI)**

Simple interaction alone does not adequately describe the conditions that create rich learning environments (Garrison & Cleveland-Innes, 2005). The concept of presence is an important one for distance learners. Presence, in this sense, encompasses the qualitative nature of educational interactions. In the context of graduate level online learning, a collaborative-constructivist model applies, which is the basis of the CoI. Lipman (1991) provides a comprehensive discussion of this basis. He notes that the likes of George Herbert Mead (1934), John Dewey and Charles Pierce recognized that inquiry is guided by situations, and that participants in this inquiry lend their qualitative presence to the situation. Building on this, Garrison, Anderson and Archer (2000) developed the seminal Community of Inquiry Model. Central to this model is the definition of three types of presence: social, cognitive and teaching. These elements are interdependent and together they are essential to the educational experience. *Social presence* is considered to be the contribution of individuals to allow expression, communication and group cohesion, which has a primary function to support cognitive presence (Garrison et al, 2000). *Cognitive presence* “is a function of sustained communication over time on important content” (Luyegu, 2015). It is defined and operationalized by the Practical Inquiry Model in four phases: a triggering event, exploration, integration and resolution (Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson, & Swan, 2008). *Teaching presence* can be considered to have two functions. The first is in the design of the learning experience and the second is in its facilitation (Garrison et al, 2000). Teaching presence is evident when structure, instruction and/or support is provided by the teacher to students, individually or to the group.

The model and each of the three presences have and continue to be the topic of many research efforts, with some refinements and validating support, including the incorporation of

learning analytics (see, for example, Arbaugh et al, 2008; Kovanović, Gašević, Joksimović, Hatala & Adesope, 2015). In a ten-year review of the model (Garrison, Anderson & Archer, 2010), the authors mention their hope that future work will use the framework to predict learning processes and outcomes from an individual course/program perspective, which has now begun to materialize (Rockinson-Szapkiw, Wendt, Whighting & Nisbet, 2016).

### **Learning design**

Mor and Craft (2012) define learning design as “the creative and deliberate act of devising new practices, plans of activity, resources and tools aimed at achieving particular educational aims in a given context (p.86). This evolving field represents new ways to share tried-and-true methods of design principles in teaching and learning with technology (Lockyer, Bennett, Agostinho & Harper, 2009). Koper and Tattersal (2005) describe learning design knowledge in three ways. First they consider the instructional design approach, which is influenced by theories relating to design principles. The second comes from best practices in teaching and learning, and the third has roots in pedagogy. These domains are heavily overlapped, but are each articulated to demonstrate the source(s) of information that a teacher uses to form their beliefs regarding good teaching and learning. The field was developed to counter the content-oriented focus on learning objects that was central to the field of online learning in the late 1990s, and was intended to capture “the richness of interactions between teacher, learner, resources and environment” (Britain, 2004, p.4). The term *Learning Design* also refers to a complex open technical specification developed from a framework created by Koper and colleagues at the Open University of the Netherlands (Koper & Tattersal, 2005). There is a lot of work yet to do in unifying the language and activities in the field of learning design (Agostinho, 2009). The field addresses difficult to tackle contextual complexities that come with



## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

teaching and learning, such as variations in students' prior knowledge, motivations, technology skills and access, demographics, and teacher/facilitator roles. Goals include theory- and data-driven guidance that can build on the experienced intuition that teachers heavily rely upon today. The promise and potential of the field lies in a new level of complexity that is not only described but equally complex data is available to capture, confirm, build and refine this knowledge (Persico & Pozzi, 2015; Mor et al, 2013; Lockyer, Heathcote & Dawson, 2013).

### **Learning analytics**

Modern online course systems collect a staggering amount of data that can serve the purpose of learning analytics: data-driven understanding and subsequent improvement of learning and its environments. Currently, learning analytics awareness is on the rise, as institutions are recognizing the need to inform decisions with data (Gašević et al, 2015). One indicator of this need is evident in the LMS data patterns explored by Park, Yu & Jo, (2016). They found a misalignment between intended LMS usage and actual usage, indicating an immature adoption of technology by the institution. This work demonstrates the need for monitoring data to inform institutional and design initiatives.

Many studies report on predictive model development and flagging systems to identify at-risk and low-performing students. For example, Macfadyen and Dawson (2010) found 15 variables in large-scale LMS data that had a simple, significant correlation to final course grade, confirming the possibility of using learning analytics to flag at-risk students for intervention. A model developed from key variables correctly identified 81% of students who achieved a failing grade. In addition, network analysis of the course discussion forums was able to identify disconnected students and the instructor's position within the network. This work shows that predictive models can be developed, and that pedagogically important information can be

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

extracted from learning analytic data. Similarly, Morris, Finnegan and Wu (2005) correlated the frequency and duration of student participation in asynchronous online courses with student success (measured as completion or non-completion). Low participation and low completion were highly correlated. This research shows that simple and available data can help instructors identify and perhaps redirect learners who are not engaged. Further work into the quality and not just quantity of participation data is suggested. Another intriguing element of this study involved the set of students who were high participators but low achievers. A teacher's perspective on how their efforts differ from their successful counterparts may be revealing. Building on the research of predictive analytics, Zhou and Winne (2012) looked at LMS trace data representative of mental events (tagging text, clicking on hyperlinks), and found that the data was more predictive of goal orientation and student success when compared to students' self-reported goals. An interesting and novel application of the power of analyzing human behaviours, this study shows the ability of analytics data to capture cognition within the dynamics of the learning environment. More recently, Kim, Park, Yoon and Jo (2016) looked at the use of proxy variables to improve asynchronous online discussion environments using 105 university students in two courses. Variables were constructed using a data mining process, and a prediction model of success was developed and validated. The model showed accuracy of 70% in week 1 of the course. This figure rose to greater than 90% by the middle of the course. This level of accuracy was achieved even though the discussion forum analyzed only accounted for 15% of the course final grade. The model was shown to be useful for identification of low achievers in this environment. Proxy variables can also be used to identify specific behaviours that may be lacking in flagged students, allowing for targeted intervention. Based on the behaviour data analyzed in this study, suggestions for improvement of general teacher practice were suggested.

A striking demonstration of what can be done when we put data in the right hands, the courses in this study have been, and can continue to be informed by empirically grounded means that will allow for evolution of the course and teacher practice.

The challenge now lies in bridging the cross-disciplinary divide between information and communications technology (ICT) professionals and education professionals (Siemens, 2013). This will enable theory- and practice-oriented data usage that can unleash the full utility of rich, extensive data sets toward refining learning theory and discovering contextually significant factors affecting learning success. Future goals of learning analytics include finding ways to use analytics to not only predict learner achievement, but guide learners along the way (Gašević, 2015).

### **Guiding research**

Various research efforts have looked at student interaction activity online. To guide the current study, papers reporting the use of interaction data in post-secondary online education scenarios to inform teacher practice in design or delivery toward improving student outcomes and satisfaction are of special interest.

Chang and Hannafin (2015) observed collaborative activities inside of large enrollment college-level biology courses in the United States. The effect of these activities on individual learning outcomes, categorized by content knowledge and higher order thinking was determined. Interestingly, in terms of achievement, high-performing students benefited from the group activities, but low-performing students did not. Further, both high performers and low performers questioned the value of the group work. The article points out important areas for further inquiry around the design, facilitation and monitoring of collaborative activities.

Joksimović, Gašević, Loughin, Kovanović and Hatala (2015) produced a correlational case study that explored Moore's (1989) three interaction types (student-student; student-content and student-teacher) plus a fourth introduced by Hillman, Willis and Gunawardena, referred to in this study as student-system interaction (1994). The frequency and duration of each type of interaction were correlated to final course grade and to course level. Overall results showed that student-system interactions had a consistent positive correlation to final course grade. In addition, student-content interactions had a negative correlation to the final grade. These results differed across course level and conflict with other reports of similar studies. The researchers hypothesized that this may represent a subset of struggling students who needed to repeatedly re-examine the course content. Integrating further qualitative and contextual elements into the research design, such as course design parameters and scaffolding for interaction, has the potential to reveal a great deal about the teaching-learning dynamics. Gašević, Dawson, Rogers and Gasevic (2016) support this assertion that instructional conditions must be considered when interpreting learning analytics data. What is clear from this study is that learning analytics can be used to inform research on student interaction patterns with great power and specificity.

Kim and Lee (2012) used online interaction data to develop and analyze a tool for visualizing online interactions in group work settings. The analysis tool is unique for its multidimensional approach, utilizing established quantitative analysis, content analysis and social network methods. Compared to one-dimensional analysis, the tool allows for a more in-depth interpretation of interactions. Its design also allows researchers to customize the criteria to various theoretical constructs. Kim and Lee suggest that the tool may reveal much more about online interactions than previous one-dimensional studies have. It also has the potential to inform teachers and course developers of the complex dynamics of a particular activity.

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

Rodríguez-Triana et al (2015) completed a design-based research project that used data from three different university degree programs involving computer-supported collaborative learning (CSCL) scenarios. The goal was to support teachers in developing, implementing and managing multiple iterations of CSCL scenarios from a monitoring (learning analytics) and scripting (learning design) perspective. The study supports the use of both pedagogical and monitoring considerations in order to be able to confirm and improve CSCL scripting logic. Teachers identified their monitoring needs (analytics awareness) upon initial course design and received subsequent reports based on these needs. Teachers participating in the study found the approach helpful in understanding student progress, learning activities and identifying unexpected events. The design-based approach of this study was able to capture the evolutionary nature required for continual course improvement. It is also an excellent example of the intimate connection between student interaction, learning design and learning analytics.

Another approach to the learning design – student interaction – learning analytics quality cycle is provided by Dyckhoff, Zielke, Bültmann, Chatti and Schroeder (2012), who designed a learning analytics tool coined eLAT. eLAT is meant to give teachers the ability to explore detailed information on their courses such as learning object usage, student behaviour and assessment results in graphical form. The idea is that complex data can be conveniently accessed and represented so that teachers can use this data with minimal time and skills burden with controlled risk to data privacy issues. eLAT then becomes a valuable data-driven informant that the teacher can use to reflect on their teaching and learning scenarios.

In their validation study of the Community of Inquiry framework, Arbaugh et al (2008) noted that the element of teaching presence consists of two distinct factors. The first has to do with learning design (course design and organization) and the second has to do with teacher

inquiry (instructor behaviour during the course). This finding furthers the notion that student interaction data, learning design and teacher inquiry go hand-in-hand.

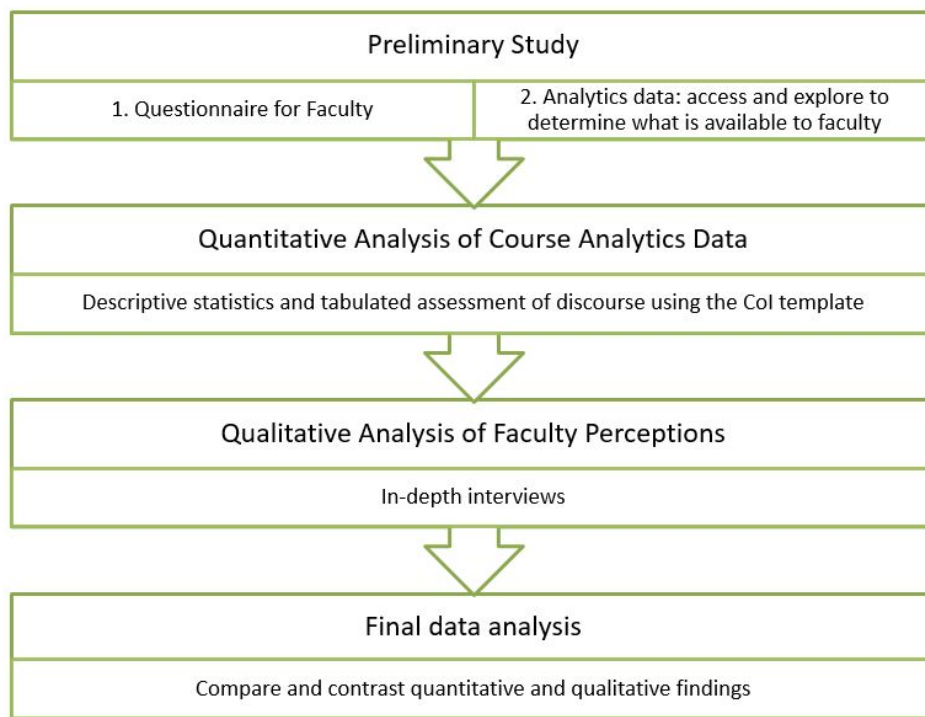
### **Summary of the State of Current Knowledge**

Student interaction patterns in online learning have been studied widely. Theories and models pertaining to interaction, presence and data usage have emerged. However, the link between theory and practice is not as clear. Some of the barriers include systemic change resistance in adopting technological tools as well as technological and time restraints. There is a paradoxical struggle between the adoption of data-driven instruments and the limited generalizability of that data due to its contextual and complex nature. Many have recognized that a good way to use data toward productive ends is to put it in the hands of the front lines, those developing and delivering individual courses. Various ways of achieving this goal have begun to emerge. Further studies are necessary to develop strong literature support, practical implementation guidance, validated measuring instruments and technological tools to reduce barriers to data access and usage.

### Chapter 3: Methodology

#### The research design

Design choice in any research study is an important one. Creswell (2013) points out that choice of a research approach involves addressing philosophical assumptions and identifying specific methods. This study uses a pragmatic worldview, with the goal of understanding as much as possible about the research problem. Fitting to this goal, a pluralistic approach is necessary. This allows the problem to become the center of inquiry; observed from multiple perspectives, in multiple forms. Figure 1 provides a visual depiction of the research activities.



**Figure 1.** Application of the Explanatory Sequential Mixed Methods Research Approach

#### Philosophical foundations of the mixed methods approach

Mixed methods provide a relatively new set of research approaches. As a third research methodology in addition to purely quantitative or purely qualitative research, mixed methods research has gained support across disciplines (Cameron 2011). Today, mixed methods are used

to ask and answer research questions with new perspectives. Creswell and Plano Clark (2007) provide the following comprehensive definition:

*Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems that either approach alone.*

In a general sense, the mixed methods approach draws on the strengths of both the qualitative and quantitative approaches, while minimizing their limitations (Creswell, 2014). Practically, it is important to realize that learning analytics are not just about numbers. Strictly limiting this study to quantitative analysis would take the focus away from the true form and function of learning analytics – to understand and then to improve our practice in teaching and learning. From a procedural perspective, the mixed methods approach is best suited to look at these learning processes. Trends can be identified (quantitative approach), but a more complete understanding of the situation is induced when a deep (qualitative) analysis is undertaken with those who might use the data – the teachers. In this study, quantitative data from online courses is collected and analyzed first, and followed up with a qualitative investigation to understand the teachers' perspectives. Creswell (2014) considers this form of mixed methods research to be *explanatory sequential mixed methods*. After sequential analysis of quantitative and qualitative data separately, the final step compares and contrasts the results to determine where the results support and/or expand on one another, and where the results are disconnected or conflicting.



### **Context of the research**

Athabasca University is one of the world's fastest growing open online and distance education institutions, serving over 40,000 students worldwide (Athabasca University, 2016). Courses from the Master of Education (MEd) program have been identified as representative of Graduate level online learning. These courses have been developed with learning outcomes consistent with the Canadian Association for Graduate Studies (2008) and the degree qualification standards established by the Council of Ministers of Education, Canada (2007) (Athabasca University, 2015).

### **Sampling**

Current faculty in the M.ED program and the courses that they are teaching have been chosen for this study. Each 14-week M.ED course offers several levels of student interactivity, including collaborative work, peer support and discussion-based activities. From a learning design perspective, these types of course activities offer a rich and varied environment in which deep, meaningful learning may occur.

Students in the program must take the first two core courses as prerequisite to subsequent courses. For students entering their third and subsequent courses, this requirement aligns student background and prior knowledge lending a measure of validity to the analysis of their behaviour patterns for this study.

Faculty teaching in the M.ED program are highly educated in their field with significant experience teaching online courses at the Graduate level. This group possesses teaching wisdom that comes with years of experience. Interviews with such individuals may provide valuable insight about the learning analytics visualizations in their courses.

Inclusion criteria consisted of the following requirements:

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

**Faculty** must have had at least three years' experience teaching online graduate-level courses, and that they had been teaching the course under study for at least one year prior to this study. Each of the two participants who were recruited actually had well over ten years' experience teaching online graduate courses, and had been teaching the courses in this study for more than four years and more than ten years respectively. The criteria ensured that Faculty had sufficient experience teaching online to openly discuss online learning principles, and that they had enough experience with the individual course under study to provide a rich, reflective perspective to the data.

**Courses** were required to be long-standing components of the M.ED program, excluding the first two prerequisite program courses, which are coded MDDE 601 (Introduction to Distance Education) and MDDE 602 (Research Methods in Distance Education). LD criteria required a structured timeline with regular (at least weekly) activity scheduled. In addition, the courses were required to incorporate regular means of LMS-based communication amongst all participants as part of the course discourse. Stable and consistent enrollment was also required so that multiple iterations of the course could be explored. The two courses used in this study fit these requirements. Three iterations of one course and two iterations of the other course were available and used for this study.

### **Data collection**

Preliminary exploration was completed via an online questionnaire to both faculty participants in order to determine current perspective and practice (Appendix G). The goal was to discern how decisions about course design and delivery are being made; to what degree these decisions are data driven; what other subjective components are used to inform decisions, and what feedback faculty get about the decisions they have made. Elements of the questionnaire

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

regarding student interaction patterns were developed using Garrison, Anderson and Archer's (2000) Community of Inquiry Model and Roblyer and Wiencke's (2003) rubric for evaluating degrees of interactivity in distance learning courses. The questionnaire was tested with colleagues and redeveloped for clarity and face validity.

Quantitative data analysis involved an in-depth look at the data inside of the course under study. A complete set of logged course data from the LMS (Moodle) was exported as excel and text files, in the same form as is available to faculty. In order to protect the confidentiality of students in the courses, user data was anonymized before analysis and confidential information was obscured.

Qualitative data collection followed quantitative data collection and analysis. At this stage, faculty were provided with the graphical and tabulated quantitative assessments that were developed from each of the iterations of their courses. In-depth interviews followed in order to elicit faculty's perspective on the meaning of the data presented, the use and utility of learning analytics as a whole, and opportunities and challenges to adopting the practice of data driven decision making into their day-to-day teaching practice.

### **Data analysis procedures**

#### **Quantitative analysis**

Important information from the log files included a timeline of course resources and activities, access logs and all forum discourse, including faculty-posted content and discussion forum activity.

Visualizations of course activities were developed. Literature-supported interaction and course design variables have been defined.

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

1. Learning design visualization: A week-by-week course timeline, as described in Lockyer et al, 2013 and supported in Bakharia, Corrin, de Barba, Kennedy, Gašević, Mulder, Williams, Dawson and Lockyer (2016) was developed. Course logs were used to quantify categorized activities within the course such as course views, page views, forum views, forum add and assignment activity on the basis of weekly activity totals. These totals were displayed in simple line graphs. In conjunction with the course schedule, activity could be followed as a function of course design (planned activities). These representations provided the simplest visualizations possible to gauge alignment between course design and student activity.
2. Log hits as a proxy indicator of total presence. In Whitmer's study (as cited in Jisc, 2016), activity inside of the LMS, categorized as activity type (including total activity) rather than specific tools/access points were "more than four times as strongly related to achievement as demographic ones" (p. 30). Total log hits are visualized by a stacked bar graph, showing each activity type per user.
3. Classical content analysis of discussion forums, as described in Lowenthal, 2016. The goal of this analysis is to identify the frequency of specific codes within the data. Discussion forum discourse was coded according to the Community of Inquiry template (Appendix I). Each element, social, cognitive or teaching presence, and each of the related sub-elements, were quantified per discussion forum, and per user. This summary was represented in tables in the simplest manner possible. A deeply developed community of inquiry is evident as sustained periods of each type of presence. Additionally, individuals can be identified by their level of engagement using the same construct.

### **Qualitative analysis**

Faculty interviews were analyzed to determine themes/categories that surfaced from the experiences they described. Much of the discussion addressed individual teacher practice and the value and utility of learning analytics as a source for decision support within this practice. Analysis began with loading interview transcripts into the qualitative analysis software tool, NVivo. Coding proceeded in an iterative fashion, much like a spiral, drilling down through the words and themes of each case. First, each case was defined and described with themes and patterns. Then, cross-case comparisons were made to expand or refine themes as necessary. This process was repeated until saturation occurred, where no further themes, sub-categories and relationships could be identified. The themes that surfaced, and their relationship with each individual case, form the qualitative description of the faculty perspective.

### **Final analysis**

Quantitative and qualitative data analysis was completed separately and sequentially as outlined. A final exercise to complete this mixed methods research is to compare and contrast findings from the quantitative and qualitative portions of study. Where results support one another, the findings of each exercise may be strengthened, confirmed or expanded. Conflicting results are also examined to discuss the implications of such findings.

### **Validity**

The researcher's inquiry affects the study, and may influence responses from faculty.

Strategies to ensure validity included:

**Preliminary study** - Preliminary exploration of faculty practice to identify sources of information serving as decision support for learning design improvements

**Triangulation of data and method** – Quantitative and qualitative analysis provided details that can support and enrich the overall understanding of the research questions

**Detailed documentation** - Each phase of the study was documented extensively to show how data was captured, assessed and integrated into later discussion

**Expert checking** – The thesis committee provided necessary expert checks to ensure that procedures and interpretations are well founded.

## **Chapter 4: Results**

Keeping with the design of this mixed methods study, data interpretation/analysis is performed sequentially. Preliminary data collected via a short questionnaire provides a look at the participant faculty's current use of learning analytics, and the various sources of information providing decision support when it comes to course design and delivery. Next, multiple iterations of the course data is extracted and anonymized. Aside from the anonymous nature of the data from the courses, the data is extracted in the same form that faculty have access to. The data is quantitatively assessed to develop learning design visualizations, provide an indicator of total presence using log hits as a proxy, and finally alignment of this presence to the Community of Inquiry framework via classical content analysis. Next, faculty are provided with the learning design visualizations, tallies of log counts shown graphically, and quantifications of each type of presence and their sub-elements in the Community of Inquiry. Qualitative inquiry follows via in-depth interviews with faculty about the data from their courses, and how they would use it and other information to iteratively improve their courses and practice. Interviews were open-ended to allow faculty to describe any elements of their practice that they deem relevant to the success of their courses. Finally, all data collected and analyzed is compared and contrasted to describe the complexities of the use of learning analytics in these examples of successful online teacher practice.

### **Preliminary Questionnaire**

The following list describes the results of the preliminary questionnaire that both participating faculty responded to as a first step in the study (Appendix H).

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

1. Participants indicated that interactions within their courses begin with teacher-driven initiation of dialogue and outreach, and evolve towards a learner-driven and collaborative dynamic.
2. Both faculty described the presence of an under-performing student as lacking in social presence and therefore falling behind cognitively as well as missing out on the guidance and support of the teacher.
3. When asked about the information sources most used for decision support towards iterative course improvements, (Table 1), both faculty ranked design and literature pedagogy and experience/intuition highest. Second was student feedback and observed student behaviours, and third was technology literature, institutional feedback and learning analytics. Ranked lower than the rest was best practice as shared with colleagues. When asked, faculty did not add any other information sources to the mix.

Table 1

*Faculty responses - sources of decision support for iterative course improvements (n = 2)*

<i>(1 = Used Heavily; 5 = Used Lightly)</i>	1	2	3	4	5	Not Used
Literature (Pedagogy)	2					
Literature (Design)	2					
Literature (Technology)		1	1			
Feedback (Students)	1	1				
Feedback (Institutional)			2			
Observations (Student Behaviours)	1	1				
Student Performance		2				
Best practice as shared with colleagues			1	1		
Experience and Intuition	2					
Learning Analytics		1	1			
Other						



## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

4. Both teachers had the opinion that the learning activities within their courses were generally being used as intended. One teacher reported that they believe so based on how often the learning activities are mentioned in forum posts and conversations external to the course (i.e. Skype). The other teacher described the clear delineation of course activities with learning outcomes provided in the course as the driving students to use the learning activities as planned.
5. Both teachers had the opinion that learners generally express an understanding of the value of collaborative activities within their courses. One teacher elaborated by saying this is because most students regularly interact. Those that do not regularly interact are contacted and there is usually an extraneous circumstance and a compromise is worked out. The other teacher stated that most students express an appreciation for collaborations after the fact.
6. Both teachers feel that they are able to identify at-risk learning behaviours early in the course. One teacher says that this is usually apparent in the students' initial introductory post as a social issue. The other teacher says that they use log data to see who has not been active in the first two weeks and personally checks on these students via email.
7. Both teachers affirmed that they have accessed the Moodle log data from their courses in the past 6 months. One teacher said that they check the logs about once every two weeks, looking for general involvement, participation rates and progress.
8. Neither teacher has ever used specialized learning analytics tools to visualize or analyze the data from their courses.

## Quantitative Analysis

Excel files of Moodle log data were extracted from each available iteration of the courses in this study, and course discourse was extracted in Word files to complete the quantitative portion of this study. Results for each analysis are individually addressed.

### Learning design visualizations.

#### *Course 1*

Logged activity, categorized by activity type, was plotted by week for comparison to the week-by-week course schedule. For Course 1, Table 2 depicts the weekly schedule and figures 2, 3 and 4 visualize the course activity for three iterations of the course, respectively.

Table 2  
*Learning design of course 1 by weekly activity schedule*

Week #	Unit	Discussion Forum	Assignment
1	1	1	
2	2		
3	2	2	
4	3		
5	3	3	1
6	4		
7	4	Debate	
8	4	Debate	2a and 2b
9	5		
10	6	4	
11	7		
12	7		
13	7	5	3

# TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

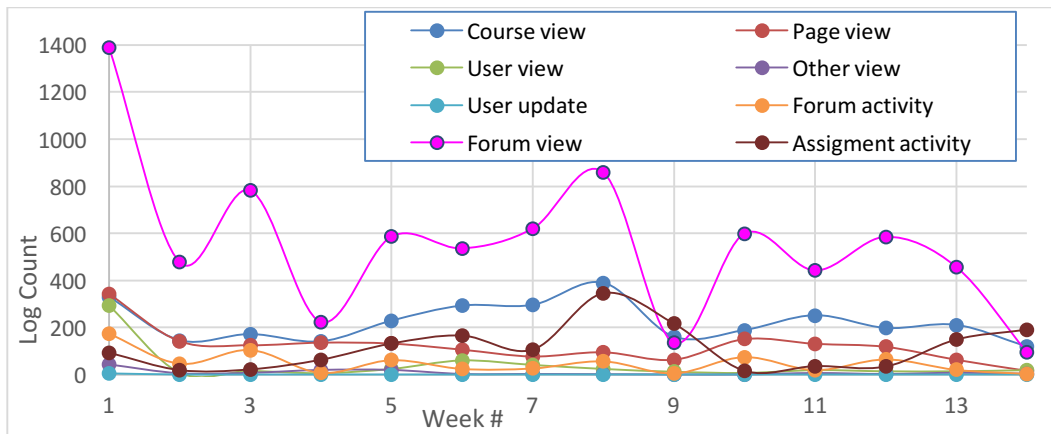


Figure 2. Logged course activity, by type, for Course 1, iteration 1 (18 Users)

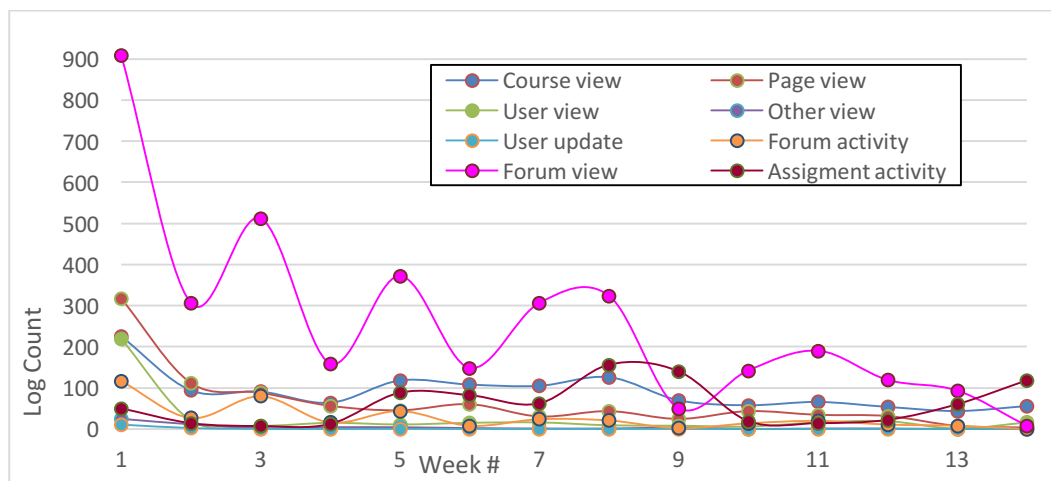


Figure 3. Logged course activity, by type, for Course 1, iteration 2 (16 Users)

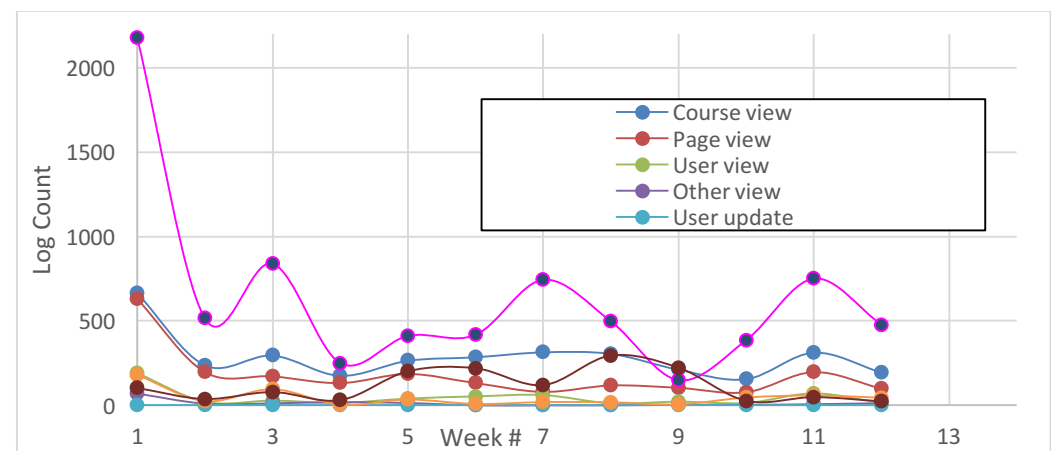


Figure 4. Logged course activity, by type, for course 1, iteration 3 (Weeks 1-12 only; 23 Users)

The data from each iteration of course 1 shows a generally similar trend in the areas of highest activity, with forum views far exceeding the other activities. When aligned with the

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

learning design activities, as shown in Table 2, peaks in activity can be seen to align with the scheduled events. Also evident in all three iterations of course 1 is that total course activity, as logged by the LMS declines steadily, with the highest activity logged in week 1 and much lower levels of activity in the last weeks of the course. Activity per user increases with enrollment. The stability of logged activity timelines over three iterations of course 1, and their alignment with the course schedule, indicates that course activities are being performed as intended in the learning design of the course.

### *Course 2*

For Course 2, Table 3 depicts the weekly schedule and figures 5 and 6 visualize the course activity for two iterations of the course, respectively.

Table 3  
*Learning design of course 2 by weekly activity schedule*

Week #	Unit	Discussion Forum	Assignment
1		Intro	
2	1	1	
3	2	2	
4	3	3	
5	3	3	
6	4	4	
7	5	5	
8	5	5	1
9	6	6	
10	7	7	
11	7	7	
12	8	8	
13	9	9	2

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

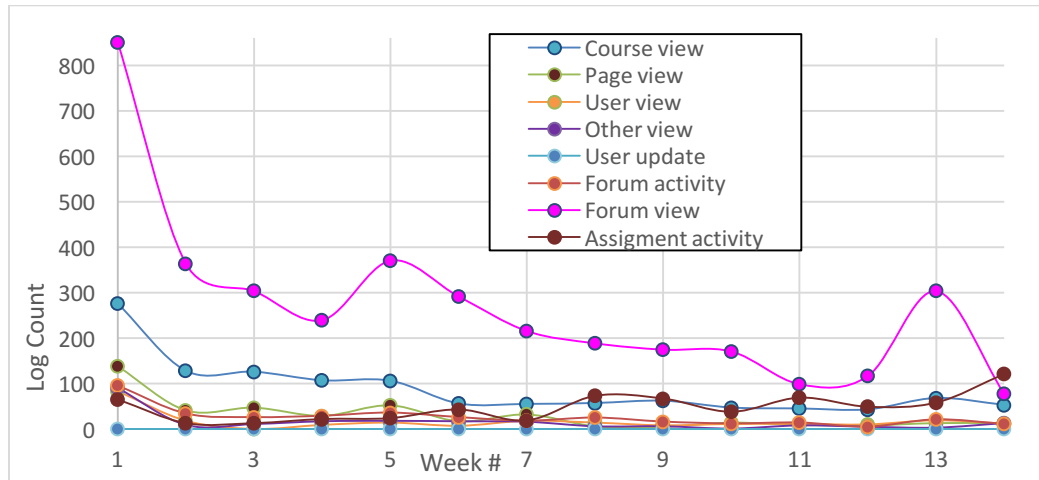


Figure 5. Logged course activity, by type, for course 2, iteration 1 (13 Users)

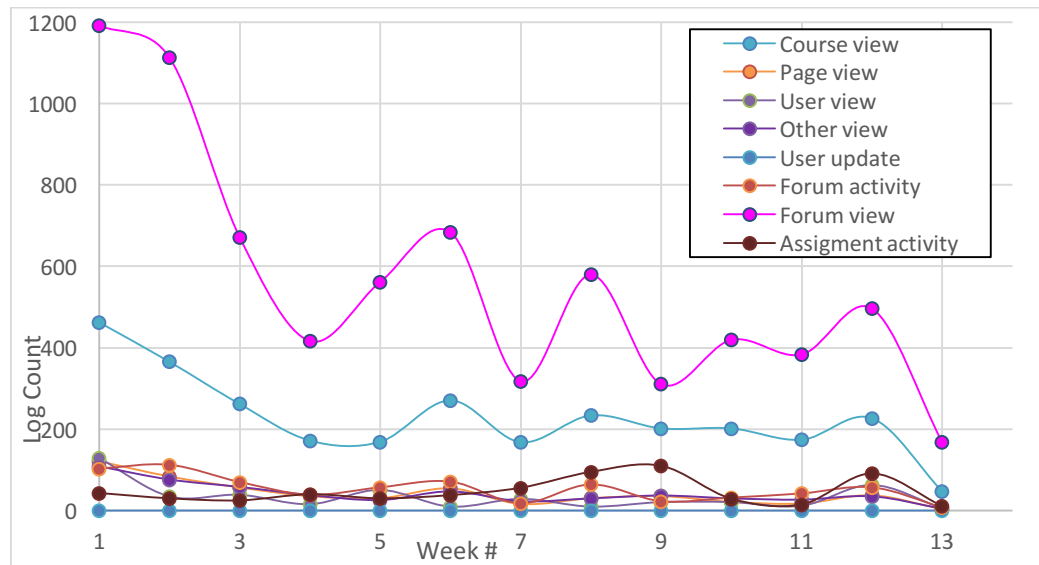


Figure 6. Logged course activity, by type, for course 2, iteration 2 (Weeks 1-13; 19 Users)

Logged activity from course 2 also exhibits highest activity levels at the beginning of the course, and relatively low levels in the last weeks. Course 2 has a learning design that plans for regular weekly discussion forum activity. For iteration 1, forum views and forum activity are stable, although generally declining, for all weeks, with a small spike observed in week 13. Iteration 2 shows lower forum participation in weeks 4, 7 and 9 when compared to other weeks. Weeks 4 and 7 correspond to the first week of a two-week forum. The forum in week 9 is a one-week forum that occurs following the deadline of the first of two large assignments. Activity per

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

user was slightly higher in the larger class. The learning design of this course intends for regular activity, which is indeed the case, although declining over the course. Week-by-week variations correspond to course assignment workload.

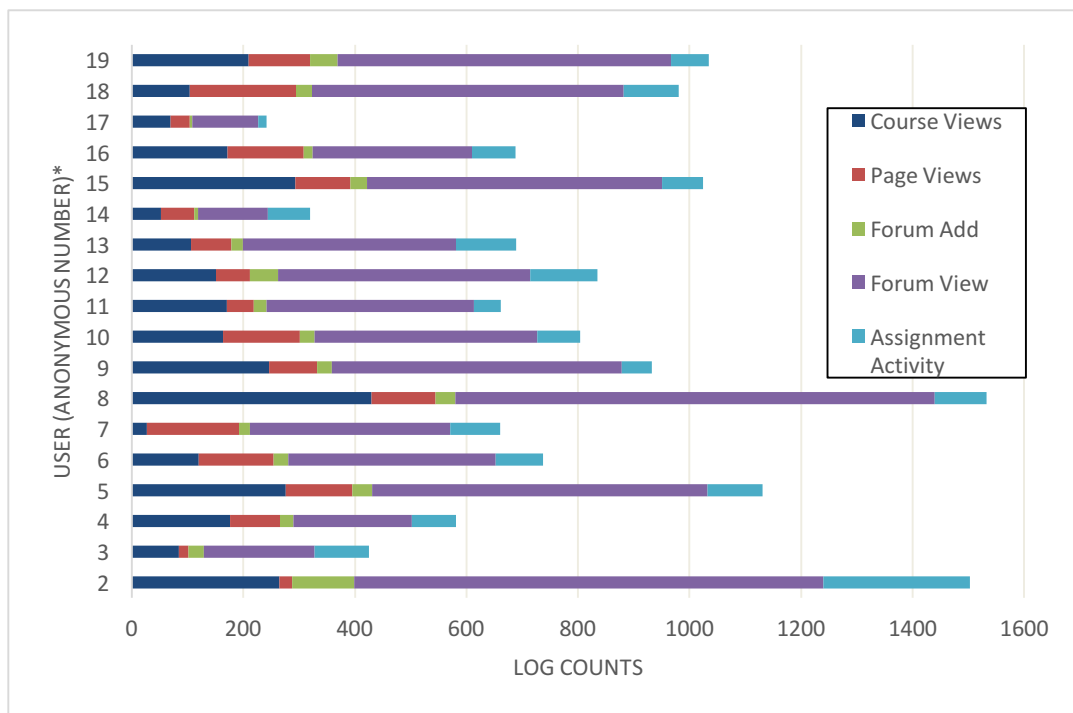
The learning design representations created here provided a simple visualization for teachers to gauge alignment between course design and student activity. Overall, there is a loose alignment evident in each course.

### **Log hits as a proxy indicator of total presence.**

Total log hits are visualized by a stacked bar graph, showing each activity type per user for each iteration of each course.

#### ***Course 1***

For course 1, figures 7, 8 and 9 represent the log hits per user for each of three iterations of the course respectively.



*Figure 7. Logged course activity, by user, for Course 1, iteration 1  
\*Co-instructed by User 2 and User 3*

# TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

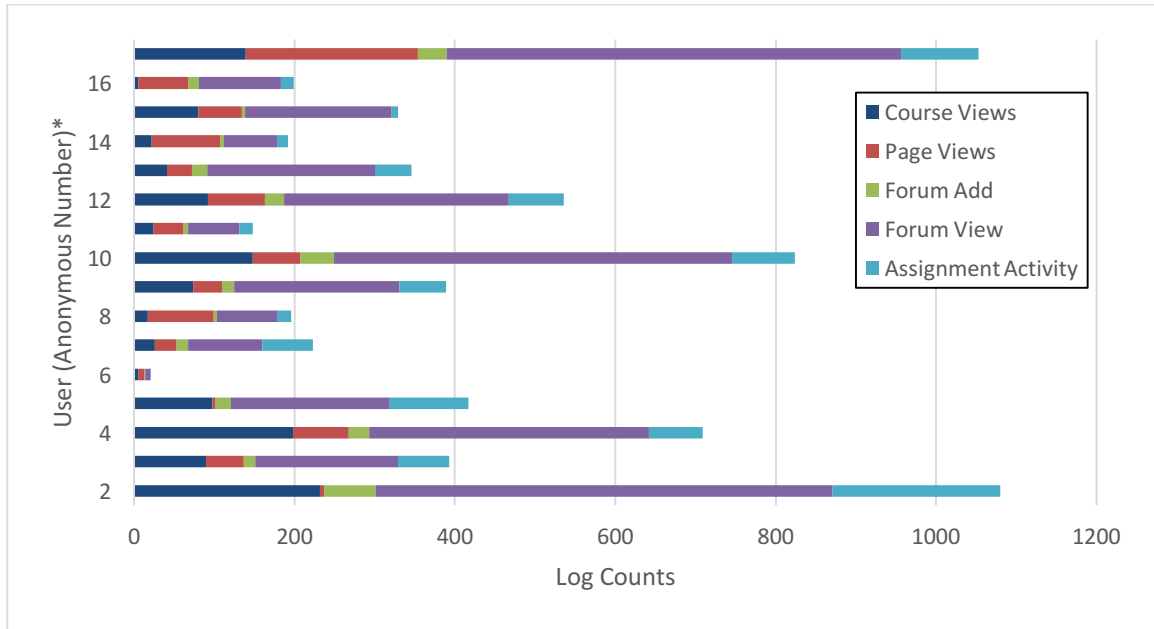


Figure 8. Logged course activity, by user, for Course 1, iteration 2  
\*Co-instructed by User 2 and User 5

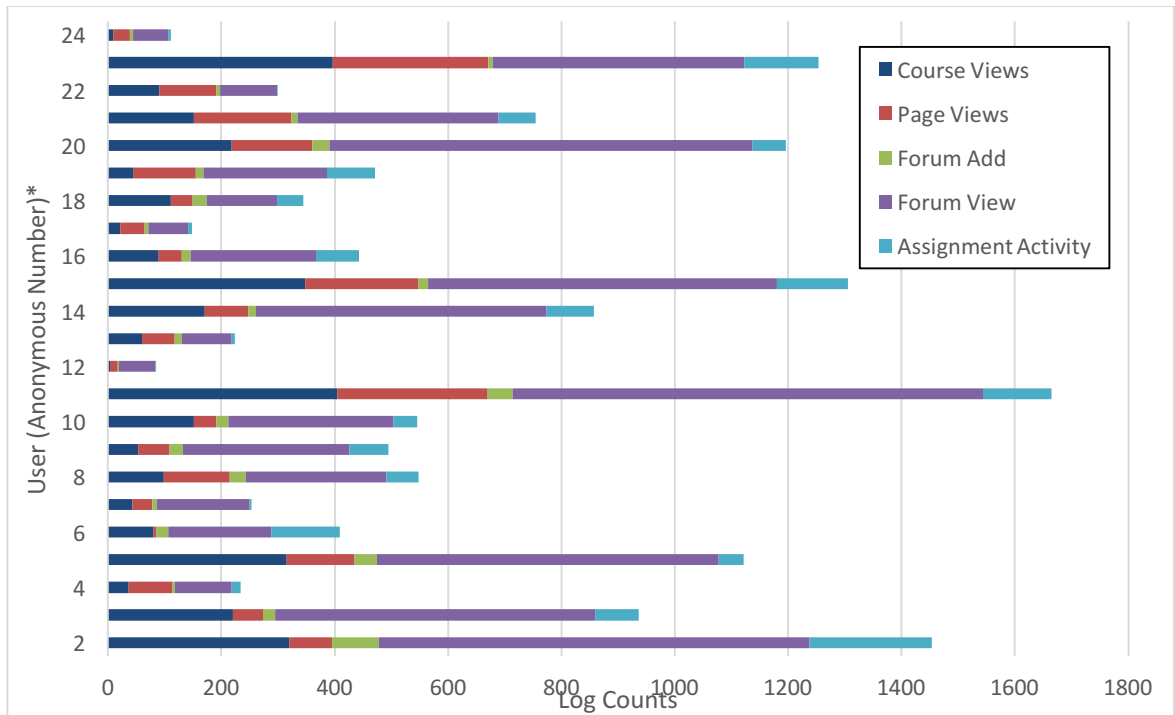


Figure 9. Logged course activity, by user, for Course 1, iteration 3  
\*Co-instructed by User 2 and User 6

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

The three iterations of Course 1 each show a wide variation of total activity per user, as logged by the LMS. This course is co-instructed by two teachers, and for all three iterations, the total activity of the two teachers exceeded the total activity of any one student. The distribution of activity type appears to be loosely stable across users, where users with higher total activity show higher counts in each activity type, and those with lower activity show lower counts in each activity type.

### *Course 2*

Figures 10 and 11 represent the log hits per user for each of two iterations of the course respectively.

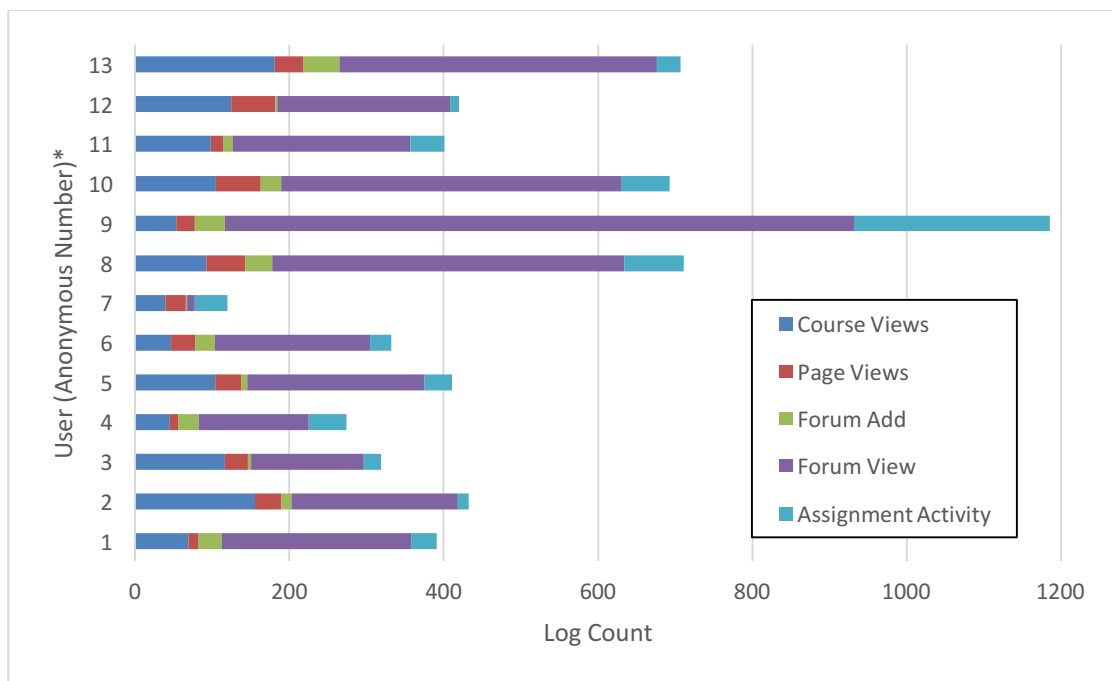


Figure 10. Logged course activity, by user, for course 2, iteration 1  
\*Instructed by User 9



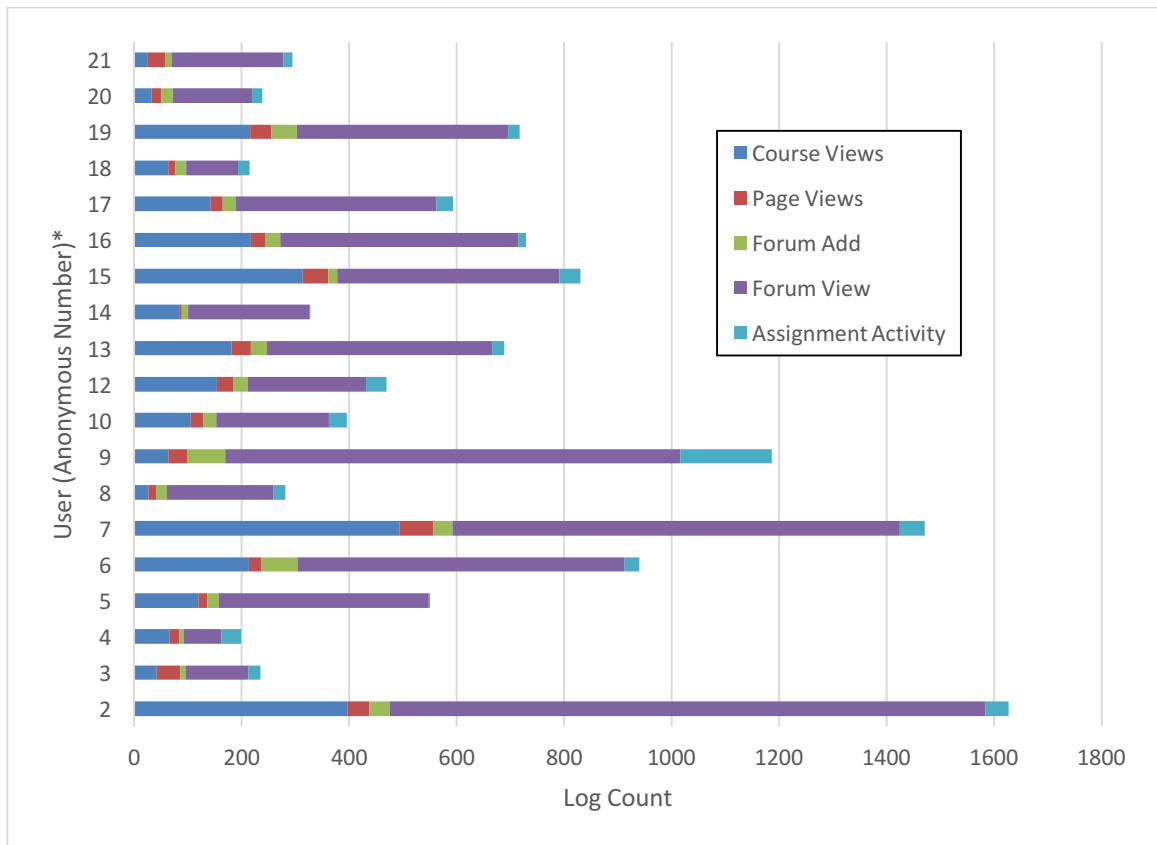


Figure 11. Logged course activity, by user, for course 2, iteration 2  
 \*Instructed by User 9, visiting interns User 5 and User 14

The two iterations of Course 2 also show a wide variation of total activity per user, as logged by the LMS. Iteration 1 showed the teacher’s activity far exceeded that of any of the students. Iteration 2 showed, on average, more activity per user, and two student users logged more activity than the teacher. The distribution of activity type appears to be loosely stable across users, with the exception of the visiting intern users.

Overall observations from the data for both courses indicate that total presence varies drastically from one student to another. The perspective of the faculty is necessary to determine what this indicates, if anything. Some possibilities include that these students dropped the course before completion, successfully completed the course despite low total presence, or were

unsuccessful in completion of the course. Another observation noted was that total presence for the instructor(s) almost always exceeded that of any of the students.

### **Classical content analysis of discussion forums.**

Content analysis was performed for each discussion forum in each iteration of the courses by coding according to the CoI template (Appendix I). The goal was to look at course discourse from a well-developed and relevant theoretical framework to discover what evidence can be gleaned from logged data, and later what insights faculty can gain from this type of analysis. Coding required some subjective interpretation of the CoI template. In some cases, excerpts from the discussions showed evidence of more than one element or sub-element of the CoI, and were coded accordingly. Each element, or presence, of the CoI model (social, cognitive and teaching presence), as well as each of the related sub-elements, were quantified for each discussion forum (Appendix J) and for each user (Appendix K). The summary tables in Appendix J and Appendix K represent this data in the simplest manner possible. Using these tables, a deeply developed community of inquiry is evident as sustained periods of each type of presence. Additionally, individuals are identified by their level of engagement using the same construct.

### ***Course 1***

All iterations of course 1 showed similar trends. First, there is evidence of all three types of presence (cognitive, teaching and social) throughout the course. Student users showed regular and sustained cognitive and social presence, while the instructors provided regular teaching presence. Second, all three presences were highest at the beginning of the course. Teaching presence showed a steady decline throughout the course, while social and cognitive presence leveled off from very high early on to lower but relatively consistent by the end. Third, cognitive

presence was most prevalent by far. Fourth, when each presence is broken down to its sub-elements, the same frequency trends were observed for all three iterations (Figure 12).

**Cognitive Presence:** Integration > Exploration > Triggering Event > Resolution

**Social Presence:** Group Cohesion > Open Communication > Emotional Expression

**Teaching Presence:** Building Understanding > Instructional Management > Direct Instruction

*Where '>' denotes 'greater than'*

*Figure 12.* Frequency trends of the CoI sub-elements for all iterations of Course 1

There is large variation across student users when it comes to total CoI presence.

Interestingly, those students with the highest levels of CoI presence were not always the same who exhibited the most 'presence' as measured by total log hits in Moodle. Across student users, the majority had much higher counts of cognitive presence than social presence, with only 1 case out of 51 students registering more counts of social presence than cognitive presence. Teaching presence amongst student users was rare, but did occur. Overall, trends in this course are stable over the three iterations included in this study.

### ***Course 2***

Course 2 also showed signs of consistency across iterations, and dynamics that differ from Course 1. Again, regular and sustained cognitive and social presence was seen in both iterations of the course; with highest levels at the beginning, including notably high counts of social presence. Cognitive and social presence showed steady decline over the course. Teaching presence was steady as well, at minimal levels. As the course progressed, levels of social presence were less prominent and levels of cognitive presence were most prominent. The sub-elements of each presence show a similar profile to that of course 1, as shown in Figure 13, with the sub-elements of social presence taking on a slightly different distribution. Again, there were no differences between iterations.

<p><b>Cognitive Presence:</b> Integration &gt; Exploration &gt; Triggering Event &gt; Resolution</p> <p><b>Social Presence:</b> Open Communication &gt; (Group Cohesion = Emotional Expression)</p> <p><b>Teaching Presence:</b> Building Understanding &gt; Instructional Management &gt; Direct Instruction</p> <p style="text-align: right;"><i>Where '&gt;' denotes 'greater than'</i></p>
--

Figure 13. Frequency trends of the CoI sub-elements for all iterations of Course 2

There is again a large variation across student users when it comes to total CoI presence. Again, those students with the highest levels of CoI presence were not always the same who exhibited the most 'presence' as measured by total log hits in Moodle. Students overall had near equal levels of total cognitive and total social presence. Teaching presence amongst student users did not occur.

### ***Summary***

There is some stability in the profile and dynamics of the CoI presences across multiple iterations of the courses in this study. There were no instances where the overall dynamics of the CoI changed from one iteration to the other, despite the large variation in the total CoI presences seen per student user. Teaching presences were reliably consistent per iteration. When comparing Course 1 and Course 2, there are distinct differences in the timing of established presences, with Course 2 building more social presence early on, while Course 1 builds and sustains prominently cognitive presence. Teaching presence profiles are also different. Although both show consistent presence, Course 1 registers much more overall across the course.

### **Qualitative Analysis**

After faculty were provided the compiled data visualizations from their courses, with no explanation or interpretation, in-depth interviews were conducted to assess meaning from the faculty perspective. See transcript for Faculty 1 (Appendix N) and transcript for Faculty 2

(Appendix O). The following represents the key themes and findings that surfaced throughout the course of these interviews.

### **Data Usage**

Both faculty expressed their belief that the LMS data collected is important to their practice of monitoring and reflecting on their courses. They each mention regular and disciplined access and activity in response to the data captured in the LMS. Both faculty expressed that they have never performed additional data analysis on the data provided in Moodle. Data access and monitoring activities are based on log data and discussion forum discourse only. About the visualizations provided as part of this study, participants found them “interesting”, but were not able to point out anything they would consider surprising to them.

### **Data Representations**

The representations of course data that related the elements of the Community of Inquiry were a new way for faculty to see the discourse in their courses. One participant mentioned that from these quantitative and anonymous tables alone, she could recognize a number of her students based on these elements. Each iteration of the course showed similar patterns of interaction as well as committed participation by the vast majority of students.

Representations of the LMS data that were presented to participants were found to be unclear at times. Participants expressed that they “had some trouble” making sense of it at first, and had the impression that the tables were “repetitive”. Each participant requested different modifications to the representations. One participant expressed the desire for minor changes to the presented data, with the addition of more detailed descriptions of the data and its origins, as well as stronger links to user identity. As this study incorporated anonymized data, it added to the issue of clarity. Another participant said about the tabulated data: “I would love to see it

visually. I was having difficulty...I would love to see a line chart, with each user, myself and the students, and see the activity...the interaction between the students and I, lines crossing when they talk to each other, I don't know if it's even possible." This describes a graphically dynamic representation of social network formation incorporating the elements of the community of inquiry which would be novel in and of itself, and worthy of some experimentation.

### **Teacher Practice**

Some explanations surfaced for the wide variation in individual student activity. In terms of teacher practice, one prominent characteristic that was noted was the provision of flexibility to students who needed it. One participant shared details from her courses that explained some of the lower individual activity. One student, "she had actually...registered for the course <a year ago>, and then she dropped out because she had cancer....So that's huge. So then I see her signed up again so when we Skyped, we had quite a lengthy conversation, she was still dealing with the chemo, etc. Well that's certainly going to affect Moodle, and participation, so what I said to her was, when she was having a bad week, don't worry about writing and reading; Skype me and we can discuss what you got from the readings." Another example: "...in the fall, <one student>...he's ADHD, and severe, and so he was quite challenged always in all of his courses with reading and writing. So I said to him, well, we can do something else rather than you participate in the forums. So what he did was...he created a journal, and even put some audio in it, some little videos. I said, it doesn't have to be reading and writing, you can talk to me...you don't have to put pencil to paper, so there's a lot of things like that going on". The other teacher mentioned similar flexibility and outreach with her students: "once a week, I check every student, every participant, I take a quick scan or a check one day a week and I look at when's the last time they logged in, how involved they've been, stuff like that, and if I notice, say six or

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

seven days have gone by and there's been no presence, then I'll send them an email and say, 'I noticed you haven't been in the course recently, are you OK...do you need any help with anything', something like that...<and> you know with some, with a very few students, it doesn't work because circumstances overtake them and they end up maybe not able to complete the course or something like that, but for the majority of students, just a little personal note from me as an instructor...they will at least respond to me and say, 'sorry I've been travelling for work, it's really busy, and so on, but I'll catch up next week'...So then I check the next week, and they're caught up and everything's OK." It is noteworthy to mention that the anonymous nature of the student data in this study prevents identification of non-completing students in the course data. Based on information provided by the faculty, a small number of students were non-completers, but not all students with relatively low activity were non-completers.

### **Course Design and Data Capture**

Participants were eager to discuss planned course activities occurring beyond the LMS. One course incorporated a group work debate scenario where designated (rather than self-selected) groups were assigned a side and prepared a formal, short argument. This particular exercise adds structure that is not usually associated with the CoI framework. When asked what pedagogical approaches underpinned the course design, this participant responded that she draws from multiple theoretical perspectives. The activity associated with the debate is not logged in the LMS, except for the final output from each group.

Beyond student collaborations, important correspondence between faculty and student occur outside of the LMS as well. When asked if there were important interactions not captured in the LMS, one participant responded: "the students' level of activity, our level of activity,

that's all reflected there in the course, in the LMS, but then, in addition to that there is a lot, a fair amount of private emails, and that doesn't get reflected".

### **Leadership and the Community of Inquiry**

In terms of the Community of Inquiry, one participant had this to say: "I begin any of the courses that I teach, during the introductory week, I connect with every one of the students through Skype [outside of the LMS]... That is enormously powerful... I was a teacher for years and it's the teacher that comes out in me with this kind of thing. To me, Moodle can be very, very exciting, but only if there is some kind of emotional connection, or social connection, with the students first. So we have about a 15-20 minute phone call, sometimes it turns into a one-hour phone call." And later in the interview, a very potent assertion: "that's selling, to me that's motivation. Those first three weeks, you are motivating them, you are making them feel very, very special, and each one of them is. And you're making sure that they know you know them, and that just makes everybody more comfortable." In addition, some insight into the Community of Inquiry framework was given: "For all of the work that Vaughan and Cleveland-Innes and Randy Garrison and Terry Anderson have done with Community of Inquiry, that's kind of missing in their research. Is that... humanistic... all that preliminary work that needs to be done to make that Community of Inquiry a success." Regarding iterative course improvements, "to me the participation, because I said to believe in the Community of Inquiry, the participation grade was very insignificant, 10%, and that last project is 60%, which is massive, so what I've done is change the participation grade <for future iterations of the course> to 20% and that last project to 50%, which I think is a better balance, and I've described what participation means, and it's much more than just the forums, and Moodle, it's connecting with me, and communicating weekly with me, which makes it... a little bit more dynamic... I am their guilty conscience, you



know, like I often send them a text, I'm worried about you, I haven't seen you for 6 days, you know, on Moodle, are you having any difficulties, and often it's just a thank you, thank you for the kick, and sorry, sorry, and they're apologizing, that's good, they're feeling guilty...manipulation."

*Impact of enrolment numbers.* Each participant reported an ideal enrolment number for their course around 20. They recall instances where enrollment was well above and well below this ideal as problematic on several levels. Recalling high enrollment situations of the past, one participant said "We just suffered...we'd often end up with 28 or 29 <students enrolled> and it was killing us...the past few years, the consensus seems to be that at the most there's 25 and after that there's an automatic second section. Then there's only 12 or 13 in each one. And that's much more amenable. So I'd say overall if you look at the amount of discussion in the discussion forums, and our wanting to be involved in those forums, to...keep track of the students' learning plus to show our presence and so on, and if you look at that and if you look at all of the assignments, and the length of the assignments and complexity of them, over 20 is grueling." About very small class sizes, specifically course 2, iteration 2: "I actually like a class of 20, it's a real challenge with 8 or 9...it's hard to build the dynamics...<course 2 iteration 2> was a sad little group, actually, because two of them had to drop out for external reasons, not anything to do with the course...one of them was travelling a lot and was up in remote areas, <one student> was going through the chemo...maybe if you could observe seven classes, then <iteration 2> might almost be an anomaly". Further about small class sizes, "it's actually not what you would think, I find it easier with the larger group. You would think with the smaller group, I'd have more time with each student, you know, the ratio. But, I think, and I was questioning, thinking of this as I looked at some of your stats, and thinking, no, I think I'm more motivated also with a

larger group. Maybe I'm not consciously aware of that until you contacted me and sent me everything...I get energized with more students, also.”

### **Technology Choice**

A lot of assigned group work, as in student-student interactions, was not captured in the LMS. Although one course provided space in the LMS for each group to work, none of the groups chose to use the space and did all of their collaboration outside of the course. One participant notes that this is something “that has changed radically in say the last 3 or 4 years...because there are so many other alternative ways of people sharing and working together now, technologically”. The additional flexibility and choice is “wonderful” for students, but “it’s certainly a disadvantage compared to what it used to be” [in terms of observation of group work dynamics].

This affordance of technology choice spills over to teacher practice as well, with alternative technologies to those in the LMS being chosen due to a perceived benefit when compared to what is available in Moodle. One faculty comment: “...I also tell them that this is the fastest way to connect with me so we do a lot of texting on Skype”. About getting students to use Skype, “...it’s surprising, actually, because only about half of them even use it. So sometimes I have to actually have to help them set up Skype or download it or whatever.” In this instance, it is clear that the alternative technology requires additional efforts on all sides. In order for analytics to capture these interactions, expansion of data collection beyond the LMS seems imperative.

### **Openness**

Both participants expressed strong support for sharing the data collected in their courses and mentoring other online faculty. The idea that this openness is not common among teachers

was also expressed. When asked if she had any concerns with the course data being used by parties external to the course, one participant says “No, I don’t at all. Which is one of the reasons...<name> has always given me two interns every fall. Even when I taught face-to-face for years, I had an open door policy. If I had my way, schools would have a two-way mirror and the community could walk in at any time and look. But most teachers wouldn’t accept that”.

***Collaborative Teaching.*** Another participant shared the benefits of team teaching. When asked if the sharing of LMS data would be a good resource for novice teachers, she asserts: “Oh, definitely, definitely. I couldn’t emphasize that more”, and describes multiple years-long team teaching scenarios that she initiated with colleagues, and how those colleagues with limited teaching experience had appreciated and learned from the experience, closing with: “so yes I think definitely anybody with not a lot of past experience in developing and designing online courses, or taking them on to teach them, I think that yes, they would benefit greatly from having access to existing online courses.”

### **Commitment to Excellence**

Finally, what stands out with these highly successful online teachers is their commitment to their courses and their students. Faculty participating in this study showed a genuine passion for their work and caring for their students. They expressed that “this kind of teaching compared to live courses, is probably generally pretty near double the workload...if you do it, in what I consider to be, conscientiously”, and “the feedback is always exceptional with my courses, I am proud to say”, and “in my feedback over and over and over again, students say it was so nice to have somebody that actually taught us rather than just dropping in every two weeks to see what’s going on”. Both faculty perform their duties on a contractual basis, and spend an enormous amount of time in the course and corresponding one-on-one with students. About finding time

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

for this commitment, “if I had a full time job as a faculty member, like when I did, and the theses supervision, I always did a ton of that, and everything else, this would be way, way, way more onerous than, say, teaching a live course.” Further about the time commitment, one participant provided some clear insight: “when I taught live, I went into a class, and I lectured for a while, and I’d say ‘any questions’ and hands would go up here and there, and we’d discuss within the class, and everyone would hear the answer, and that would be it. Well now, it’s not that, it’s individual. So everything is multiplied in terms of time requirements.”

### **Summary of results with respect to the research questions**

While applying theory and learning design principles to LA activities, teacher participants were able to identify promising insights/strategies toward goal-oriented adoption. Within the CoI theoretical framework, a student’s total presence and presence profile in discourse is more indicative of student participation in the learning community than the easier to access and widely used log count. One strategy suggestion from this exercise is to move away from the use of superficial log data and monitor/evaluate student engagement using theory-grounded analytics paired with qualitative interpretation by the teacher.

In the preliminary questionnaire, teachers ranked two sources of decision support for iterative course improvements above all others. They were design and pedagogy literature and experience and intuition. This insight reveals a natural link that LA can realize by explicitly using course data to demonstrate, document, experiment or share design and pedagogy choice along with the teacher’s actions along the way. Quantitative and qualitative data collected in this study demonstrates that design and teacher practice have separate and distinct influence on student success.

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

Results uncovered some opportunities that LA presents for teachers in these courses. First, LA can be used to reflect on the teacher's leadership role in the establishment of the CoI. Teachers know intuitively that this is a crucial step towards a successful learning experience within their courses, but do not have guidance on what exactly they should do to facilitate this. The use of LA for this purpose promises to not only strengthen the teacher's practice in their role, but has the potential to advance understanding of the CoI in general. A second opportunity is found in the learning design strategy that a course is structured around. Data from course activity linked to learning design elements reveals where students are spending their time and efforts, which can be used as a baseline for future changes. Post-change course data can then be assessed for intended or unintended effects.

Challenges that surfaced include the superficial current use of Moodle log data, with no additional analysis being performed. An onerous task for any busy faculty member, this challenge can be addressed by the provision of custom analytics support. Secondly, even if analytics support were provided, there is a significant amount of relevant learning data that is not captured by the LMS. A greater challenge, then, would be the need to expand data capture across various platforms. This challenge requires policy redevelopment and change to privacy laws, encompassing a general culture shift toward open learning data.

## **Chapter 5: Discussion**

### **Introduction**

The combination of LMS data analysis and qualitative elaboration from the faculty involved in the course has provided enormous insight that any single method of inquiry could miss. Key observations from this inquiry have emerged. Regarding course data, current use by faculty is at the superficial level, with log data being consulted regularly to identify and reach out to disconnected students. When the data is looked at on a deeper level, grounded in the theoretical construct of the CoI and the principles of LD, and aided by faculty interpretations, an understanding of the learning environment and student behaviours emerged. The data showed alignment to the CoI framework, and hints at the possibility of using this framework to evaluate individual student engagement and the impact of the teacher leadership approach in a course or activity designed to subscribe to this framework. Also of impact is that each faculty participant had a unique inquiry approach, and so what they found important in terms of analytics support were also different. A cautionary note is necessary when assessing LMS data in order to acknowledge incomplete data capture. An opportunity to use learning analytics in its current form has presented itself in the form of teacher collaborations such as the formation of an open community of practice and team teaching or mentorship for new online teachers.

### **The Use and Form of Analytics Data**

Faculty participants expressed their belief that LMS data is important to the practice of monitoring and reflecting on their courses. This finding is often mirrored in the literature (Van Leeuwen, Janssen, Erkens & Brekelmans, 2015; Mor et al, 2015). However, simply providing the data in its crude form resulted only in its superficial use, such as the monitoring of log hits.

Important information about teacher and learner activities can be gathered beyond simply counting user actions.

### **Learning design visualizations**

Visualizations based on theory-grounded constructs were able to provide specific information linking course design and teacher practice to student behaviour data. Qualitative input from the teacher was vital to the accurate interpretation of this data. Learning design visualizations showed that course activity dynamics were stable across the three iterations of course 1 and the two iterations of course 2. Spikes in activity occurred when LMS-logged activities were scheduled such as discussion forums. Dips in activity were explained by either scheduling of quiet weeks for readings and assignment work, or for other affordances from the teacher. Some of these affordances were not gleaned from the data alone, but were noted during faculty interviews. For example, one teacher provided an opportunity to re-submit a first assignment. About this opportunity, she had this to say: “most of <the students> take advantage of that. And again, that’s pedagogy isn’t it? How many times have you received a paper, you slide down to the end, you look at the grade, you put it away and get on with the next one. But, if I’ve made all of the APA comments and all of the additional research they could have done, and they go through the paper and actually do them, its deep learning...So that’s another thing that <students> tend to appreciate. And <it> might take away from the forum discussion again, because they’re working on their first assignment longer than usual.” The data showed that this did cause a quiet week despite a scheduled forum (see figures 5 and 6 for both iterations of course 2, week 9). As a conscious and purposeful decision by the teacher to capitalize on a learning opportunity presented by the assignment, the reduced discourse was a planned activity to optimize the potential for learning in that situation. Another element of the learning design

visualization that was not explained until faculty interviews was the steady decline of logged activity as the course progressed. This occurred in all iterations of both courses in this study.

Although this could be interpreted as declining student engagement throughout each course, it is more accurately described as a shift from activity within the LMS to activity external to the LMS. Although limited by incomplete data capture, the learning design visualizations were generally able to relate planned activities to student actions. Any future changes to the course would benefit from the ability to monitor how the change affected behaviour patterns.

Rodríguez-Triana et al (2015) support the idea that planned activities (scripting) should be linked to monitoring activities in an iterative fashion to continually inform design choice in online learning environments. The LD perspective in LA was a simple and feasible approach for teachers of these online courses, requiring minimal technical knowledge or time to access and visualize.

### **Log Counts**

Visualizations of LMS log counts appeared to provide some insight for teachers to reflect on. Although the use of log count data is somewhat superficial, it has been linked to predictions of student engagement and success in many simple and large-scale studies. (See, for example, Morris et al, 2005; MacFadyen & Dawson, 2010, Zhou & Winnie, 2012, Kang et al, 2014.) The courses in this study showed recurring trends in log count activity. They were:

**High activity counts for the teacher(s).** In all cases, the teacher(s) were among those with the highest activity counts for the course. As these courses are well-established and taught by experienced faculty, the activity counts observed can be assumed to be stable and necessary to the established practice of the teacher(s). Immediately, one can observe that these courses are not designed to run in a manner that minimizes the time requirements of the faculty, which is a



common misconception of online learning (Moore & Kearsley, 1996; Anderson, 2008; Zawacki-Richter & Anderson, 2014). Consistent and extensive attention and activity from the teacher drives the course.

**Similar activity profiles among student users.** Despite wide variations in total log counts, the usage profiles remained stable, with most logged activity for each student user coming from forum views, then from course and page views; assignment activity and forum additions.

**Large user differences in total activity.** Frequency of LMS interactions by students varied. Some student users logged total activity that was five-fold or more than the majority of their colleagues. Other users seemed minimally engaged based on their log counts. Faculty noted several instances where low log activity had nothing to do with low engagement in the course, but rather the variation was due to either some pre-negotiated alternative form of activity or simply varying technology preferences on the part of the student. For example, some students chose to download and print all content at the beginning of the course, whereas others chose to access resources directly from the course pages daily.

Overall, log counts as a data source in these courses did not provide useful information to teachers. On the surface, the data seemed to be telling us something about the interaction patterns and presence of users. Upon deeper inspection, the wide array of course activity that occurs outside of the LMS logs made the log hit counts an incomplete measure of total presence. It would not be wise to take such data out of context of this course, for example, into an institution-wide data system, to try and assess the interactivity of the course or student performance metrics in any way. If a true measure of crude student activity were to be taken, analytics collected would need to be expanded to include all possible forms of interaction taking place by students

during their learning efforts for the course. As a mass expansion of data availability like this is nowhere near feasible in the near future, the use of total log hits from the LMS is not a measure worth pursuing in LA activities of these courses. Even in courses where total log hits do reflect all course activity, the interpretation of such counts should be left to those that are within the context of the course, such as the teacher, who is familiar with the students and some of the choices that they would be inclined to make. Richards (2011) makes this point eloquently when he says “Learning Analytics is not simply about counting hits or mapping discussions, it is about intelligent and thoughtful interpretation of data in the context of human activity”.

### **Incomplete Data Capture**

LMS data from the courses in this study only captured a fraction of the activity that both learner and teacher engaged in throughout the course. Group work, external communications, readings, research and all assignment production was external to both courses. In terms of grade percentage, all of this accounted for up to 90% of the final grade. In order to obtain more insight into the ways we learn, form new learning theories or test existing theory, data collection must be extensively expanded. As technology tools become more ubiquitous, there are bound to be more opportunities to exploit the benefits of alternative technologies outside of an LMS, meaning less activity and less to observe in the LMS. Siemens (2013) supports the notion that data collection beyond the LMS is increasingly required to effectively capture the collaborative and varied learning paths that students choose.

### **Discourse Analysis and the CoI**

Discourse analysis based on the CoI as an applicable pedagogical framework in this case study was able to provide new insights of the course dynamics. It was noteworthy that the timing and extent of the CoI dynamics, even the sub-elements of each presence, were unique for each

course. Interesting observations include the stability of the CoI dynamics over multiple iterations of each course, and the unique timing of the establishment of the CoI elements, with evidence that both course structure and teacher practice influence the crucial establishment stage of the CoI.

Course 1 was consistently characterized by high levels of all of the three CoI presences (cognitive, social and teaching) at the beginning of the course, with cognitive presence dominating the discourse. Over time, levels of teaching presence decreased most, and levels of cognitive and social presence also dropped but stabilized by the end of the course.

Course 2 had a consistent but slightly different set of dynamics, dominated by social presence early on, with highest cognitive and social presence throughout and much lower, but stable, levels of teaching presence.

For both courses, CoI presence totals per user varied widely. Those with the highest CoI presences were not always the same as those with the most log hits in Moodle. Aside from special cases where alternative activities from discussion forum participation were arranged for students needing them, the measures of total CoI presence were more qualitatively aligned with student performance in the course than log counts according to the teachers. Intuitively, this finding makes sense since the CoI framework captures specific and deliberate efforts to engage in the learning process rather than just patterns of page clicks.

### **Insights Informing Teacher Practice**

The stable CoI footprint, even with fluctuating enrollment numbers and a wide variation of student participation levels, is an interesting way to look at the intersection of course design and teacher practice. The course design elements and the quantitative LMS data alone does not provide a sufficient basis for the difference between the two courses. Insights from faculty make

a lot of what the data shows much clearer. Far beyond the planned learning activities, grading structure and nature and timing of assignments, the leadership of the teacher had a powerful influence on the dynamics that shape the CoI. Especially early in the course, extensive teacher activity is dedicated to establishing a well-defined structure, which could be rigid or open. Structural elements such as discourse and course work expectations; modes of communication and a certain level of social connection set the tone for the entire course. The work of Phirangee, Demmans Epp & Hewitt (2016) mirrors the idea that the instructor plays a large role in the establishment of a learning community. This is one reminder that there is still a lot of research left to be done. Experienced, successful online faculty have valuable insights to guide us. Additionally, outreach and flexible solutions for students that are struggling to conform to the predetermined course structure clearly allows more students to be successful.

### **The Provision of Visualized Data to Faculty**

When visualized data from their courses was simply presented to faculty, the impact in terms of new insight was minimal. Faculty had no prior input towards which constructs would be used to produce the visualizations. With minimal understanding of the data construction process, faculty participants did not recognize much new information in the data visualizations taken from their courses. Both faculty expressed the desire for clearer and more customized data visualizations. This supports the idea that the provision of LMS visualizations alone results in weak or ineffective use of the data towards productive ends (Gašević et al, 2015). Despite this fact, the data did reveal extensive detail of student activity in relation to course design, teacher activity and the dynamics of establishing and maintaining the CoI presences. A practical implication emerges from this that teachers should be involved from the beginning to co-construct data representations that may be well understood and represent what the teacher is

interested to find out about their course (McKenney & Mor, 2015; Bakharia et al, 2016).

Accessing applicable data for a given course allows a teacher to monitor the impact of varying their leadership approach and course design elements, among other things such as class size and so on. As a resource for new online teachers interested in teaching online courses grounded in a similar theoretical frame, important data on student activity patterns and presence, including important social, cognitive and teaching parameters can be made available. Comparisons between courses should strengthen insight to give teachers a better idea of what variety is possible within the online learning environment. If paired with the mentorship of the experienced faculty, it is likely that more successful elements of these online courses may be replicated and optimized in other settings.

The production of the representations provided to faculty in this study were laborious and time-consuming. It would not be feasible for faculty to analyse the crude data from their courses to such an extent on their own in addition to their existing responsibilities. The bottom line is one that has been expressed by Persico and Pozzi (2015): faculty need analytics support if they are going to exploit LMS data beyond the very basic form currently available, and this support will vary depending upon the pedagogical approaches of the course and the teacher's inquiry.

With respect to discourse analysis specifically, there exist several automated discourse analysis tools that may be deployed to support teachers in this regard. Most notable to the context of this study are Coh-Metrix (Graesser, McNamara & Kulikowich, 2011) and Cohere (Buckingham Shum & Ferguson, 2012), as well as social learning analytics concepts, as described in Ferguson & Buckingham Shum (2012)., such as SNAPP (Bakharia & Dawson, 2011).

### Summary

With respect to the research questions, further insights and opportunities have been identified in this discussion. Teacher insights reveal the importance placed on course data as a valuable tool in their practice, both in a monitoring and reflective capacity. Superficial use of log count data is the only form of course data currently utilized. LA developments, specifically CoI and LD grounding, have the potential to drastically increase the utility of this same data. It is important to note that the predetermined data visualizations presented to faculty in this study did not have much impact on the faculty's understanding of their course structure or their practice. Rather, teachers requested customized, theory and design-grounded data representations that are linked to their goals within the individual course. Additionally, data gathered from the LMS and analyzed quantitatively required the teacher's qualitative interpretation. Much of the activity timelines, individual user variation and the CoI dynamics were explained only when the teacher's reflections were incorporated into the analysis. Further regarding the CoI, it provided a tidy model that intersected course design and teacher practice.

Having identified many insights from the faculty perspective, opportunities to apply LA on a more sophisticated level are a natural next step. Teacher participants revealed another opportunity in their desire to open up their practice. Paired with rich and detailed LA data, teachers can choose to share their experiences and data to form a community of practice toward advancing the field of online learning and accelerating the progression of novice teachers. Teachers and institutions who embrace this opportunity could realize much-needed improvements to teaching innovation in a team-based, supportive environment.

## **Chapter 6: Conclusion**

The rich and varied nature of evidence and insights collected in this exploratory case study showcases the complex, contextual and social nature of online learning at the graduate level. Course design is an important element to building successful online education experiences, and teacher activity brings it to life. Learning analytics gives us the opportunity to observe these dynamic complexities, and can become a valuable tool for online teachers. In order for teachers to be able to exploit this opportunity, analytics support is necessary. Teacher driven and customized analytics, along with the reflective practice of the teacher, is necessary to avoid generalized or misunderstood data representations. The learning analytics process of this study highlights the importance and impact of many elements of the online learning experience such as flexibility in technologies, activities and timing; the teacher's leadership; clear and open communication; and a well-defined course design.

### **The Community of Inquiry**

As a well-established and supported framework of graduate online learning, the CoI forms the basis for many collaborative-constructivist learning scenarios. Still, there is work to be done in describing essential conditions in establishing a robust and inclusive learning community. The reflections of faculty in this study show that their behaviours are carefully situated to build a successful CoI. Ke (2010) found that the instructor's behaviour, along with the design of the course, were crucial to students satisfaction of their CoI experience. CoI elements affecting student retention were studied by Ice, Gibson, Boston and Betcher (2011) and it was found that facilitation of discourse by the teacher was one of the most important. Yet, in the years since these studies, there hasn't been an agreement of what exactly the teacher should be doing. Clarke and Bartholomew (2014) analyzed instructor behaviours in online discourse and

noted that instructors find it difficult to find the right balance of participation and so it is an ongoing problem that would benefit from some data sharing from those who get it right. The CoI analytics taken from the discourse in this study describe two distinct approaches to establishment of a CoI, and details of the preliminary work required to ensure its success. Further investigation is recommended to define these preliminary conditions and explore the students' perception during the process.

### **An Opportunity – Teacher Community of Practice**

We are realizing more and more that good teachers are not simply content experts. Educators have a responsibility to stay informed not only in their field, but also in the rapidly changing education environment. A daunting task on its own, online educators face a barrage of new techniques, terminology and technology innovations.

It is important to prepare new online teachers for the reality they are entering into. An acceptance of the fact that teaching online takes substantial and ongoing time commitments, especially when compared to teaching face-to-face, is imperative. Planning and institutional support for this workload must be in place.

The faculty in this study share their support for opening up their practice to the teaching community and beyond as a way to advance their practice and the field in general. This study alone can provide two excellent and unique examples of online community building, leadership styles, course structure and the impact of flexibility and presence on student motivation and success. Expand this idea across a program of study, and the influence of teachers and learning scenarios can be traced with much broader theoretical and practical implications.



### Summary of Recommendations

**Practical applications.** The pragmatic lens of this study describes a number of implications that online teachers and institutions should take note of.

***Include qualitative analysis in LA.*** Analytics data can be used to a much greater extent than it currently is. Rather than mass collection and diluted analysis of large quantitative data sets; smaller, more specific and well-defined contexts can be looked at in great detail. Qualitative data builds, supports and explains many observations in the quantitative data.

***Apply theory.*** Context-specific LA is the key to applying and refining theoretical frames to online learning scenarios, while also encouraging creative teaching and design approaches. LA can be conveniently set up as a responsive feedback system where the teacher can innovate and reflect iteratively on their course, their own activity and the activity and success of their students. In doing so, applicable theoretical frameworks can be applied. In this study, the CoI framework was identified as applicable to the learning scenarios analyzed. The cases showed differing dynamics establishing the CoI, helping us to understand that there are various ways in which experienced online teachers lead their courses to successful ends within this frame. Beyond the specific examples presented here, any online course can be evaluated using existing or emerging theoretical framework(s). These activities can lead to new theory development, refinement of existing theory, or evaluation of a course design or teacher practice.

***Custom and on-demand analytics support.*** In order for iterative, data-driven teacher practice to come to fruition, certain institutional activities and support structures are necessary. First, data support must be provided to faculty. Not only do faculty need data available to them in a form that is easily accessed, but they also need support in the analysis of this data, as the sheer volume of it is immense. Because of the unique goals and contexts of the myriad of

teaching scenarios, data support must be available in the form of custom analytics. This allows for faculty to specify what data they need to see and have it represented to suit their goals for a specific course. Although this sounds daunting, the data is there and data scientists have been accomplishing similar feats in other sectors, such as banking and marketing, for years.

***Expand data capture.*** In order to exploit the opportunities offered by LA, data availability must expand beyond the LMS to include the many ways that students and teachers interact with the content and with each other. The cases presented here show that data available to faculty is only a fraction of the total activity that occurs in a given course. If we are to advance the field and our understanding teaching and learning behaviours, a more complete data set is necessary.

***Encourage development of a Community of Practice.*** Online teachers can benefit from the shared experiences of their peers, including access to the data shaping their decisions. In this study, both faculty stressed their support for team teaching, mentorship and opening up their practice to the community. Participants felt that opening up and working together helps to build a solid foundation beyond the individual's past experience, thus accelerating the professional development of the teacher. Most online faculty are not choosing to share their experiences, and even more cannot share course activity data, even if they wanted to. Current cultural norms in academia do not encourage a team approach, especially across disciplines. There is a need to align institutional culture to support sharing as a mutually beneficial activity. In addition, the redundant and overlapping privacy laws in Canada have most institutions playing it safe and requiring explicit consent before any student data is shared (Scott, 2008). Updated privacy laws need to acknowledge the realities of the information age, and provide safe means to use data in education settings.

**Future research.** This study has triggered further questions about the role of LA in the online teacher's practice, and in informing theoretical models of online education.

**Implement and follow.** Various pilot studies implementing teacher-driven, on-demand analytics support for a set of courses should be documented. Specific findings, whether it is theory refinement or improvements to the learning scenario, would confirm or deny this study's claim that teacher-driven, open and iterative LA is a worthwhile pursuit for institutions of higher education.

**Expand to other learning scenarios.** The practical applicability of the recommended LA approach using teacher-initiated data support should be documented across many established pedagogical frameworks and content disciplines. A larger sampling of teacher perspective may reveal more about how and when this approach might produce improved learning environments or new learning theory knowledge.

*Study the teacher's role as leader in establishment of a CoI.* This study revealed that we have more to learn about the teacher's role in establishing a healthy CoI. Dimensions that overlap social and leadership characteristics seem to be important factors, but are not well defined. A comprehensive study of a large set of very successful and less successful CoI-based courses may reveal discourse dimensions that are crucial to the CoI success, and how the teacher influences them.

### **Leading the Future**

The field of online education is evolving quickly and being reinvented in new and previously unimagined ways. As such, it is an ongoing experiment. Teachers and the institutions that support them must be brave enough to continue to innovate, striving to build society a better toolbox in order to thrive in this changing world. Any decent experiment is informed from those

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

previous, which calls on the necessity to open up about our successes and failures, and listen up to those of others. The process of learning analytics gives us that platform. The door is open and now we must collectively and purposefully walk through it.

### References

- Agostinho, S. (2009). Learning Design Representations to Document, Model, and Share Teaching Practice. In Lockyer, L., Bennett, S., Agostinho, S., & Harper, B (Eds.), *Handbook of Research on Learning Design and Learning Objects: Issues, Applications, and Technologies*. Hershey, PA: IGI Global. doi: 10.4018/978-1-59904-861-1
- Anderson, T. (2003). Getting the mix right again: An updated and theoretical rationale for interaction. *The International Review of Research in Open and Distributed Learning*, 4(2). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/149>
- Anderson, T. (Ed.). (2008). *Theory and practice of online learning* (2<sup>nd</sup> Ed.). Edmonton: AU Press
- Athabasca University. (2015, June 20). *Athabasca University Centre for Distance Education. Master of Education in Distance Education*. Retrieved from Athabasca University: [http://calendar.athabascau.ca/grad/current/distance\\_03.php](http://calendar.athabascau.ca/grad/current/distance_03.php)
- Athabasca University. (2016, July 9). *Athabasca University at a Glance*. Retrieved from Athabasca University: <http://www.athabascau.ca/aboutau/glance/>
- Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K. P. (2008). Developing a Community of Inquiry instrument: Testing a measure of the COI framework using a multi-institutional sample. *Internet and Higher Education*, 11(3–4), 133–136.
- Bakharia, A., Corrin, L., de Barba, P., Kennedy, G., Gašević, D., Mulder, R., Williams, D., Dawson, S. & Lockyer, L. (2016). A conceptual framework linking learning design with learning analytics. *LAK '16 Conference Proceedings: The Sixth International Learning Analytics & Knowledge Conference*, pp 329-338.
- Bakharia, A. & Dawson, S. (2011). SNAPP: a bird's-eye view of temporal participant interactions. In *Proceedings of the 1st International Conference on Learning Analytics & Knowledge* (pp. 168–173). NY, USA: ACM NEW York.
- Britain S. (2004). *A review of learning design: Concept, specifications and tools*. A report for the JISC E-learning Pedagogy Programme, May 2004. Retrieved May 28, 2016 from [www.edtechpost.ca/wordpress/files/2004/07/ACF83C.doc](http://www.edtechpost.ca/wordpress/files/2004/07/ACF83C.doc)

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

- Buckingham Shum, S. & Ferguson, R.. (2012). Social Learning Analytics. *Journal of Educational Technology & Society*, 15(3), 3-26. Retrieved from <http://www.jstor.org/stable/jeductechsoci.15.3.3>
- Cameron, R. (2011). Mixed Methods Research: The Five Ps Framework. *The Electronic Journal of Business Research Methods* 9(2), 96-108, ISSN 1477-7029
- Chang, Y. & Hannafin, M. (2015). The uses (and misuses) of collaborative distance education technologies: Implications for the debate on transience in technology. *The Quarterly Review of Distance Education*, 16(2), pp. 77-92. ISSN 1528-3518
- Clarke, L. W., & Bartholomew, A. (2014). Digging beneath the Surface: Analyzing the Complexity of Instructors' Participation in Asynchronous Discussion. *Online Learning*, 18(3).
- Creswell, J. (2013). *Qualitative inquiry and research design: Choosing among five approaches*. Los Angeles: Sage
- Creswell, J. (2014). *Research design. Qualitative, quantitative and mixed methods approaches*. Los Angeles: Sage
- Creswell, J. & Plano Clark, V. (2007). *Designing and Conducting Mixed Methods Research*, Sage, Thousand Oaks, California
- Dewey, J. (1938) *Experience and Education*, New York: Collier Macmillan
- Dyckhoff, A. L., Zielke, D., Bültmann, M., Chatti, M. A., & Schroeder, U. (2012). Design and Implementation of a Learning Analytics Toolkit for Teachers. *Journal of Educational Technology & Society*, 15(3), 58-76
- Ferguson, R. and Buckingham Shum, S. (2012). Social Learning Analytics: Five Approaches. *Proc. 2nd International Conference on Learning Analytics & Knowledge*, (29 Apr-2 May, Vancouver, BC). ACM Press: New York
- Fulford, C. P. & Zhang, S. (1993). Perceptions of interaction: The critical predictor in distance education. *The American Journal of Distance Education* 7(3), 8–21.
- Garrison, D.R. (2011). *E-Learning in the 21st century: A framework for research and practice (2nd ed.)*. New York: Routledge.
- Garrison, D. R., & Anderson, T. (2003). *E-learning in the 21st Century: A Framework for Research and Practice*. London: Routledge
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in text-based environments: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87–105.

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

- Garrison, D. R., Anderson, T. & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *Internet & Higher Education*, 13(1/2), 5-9. doi:10.1016/j.iheduc.2009.10.003
- Garrison, D. R. & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *American Journal of Distance Education*, 19(3), 133–148.
- Gašević, D. (2015, May 19). *Learning analytics – Current status and prospects*. Retrieved from <https://solaresearch.org/core/learning-analytics-current-status-and-prospects/>
- Gašević, D., Dawson, S., Rogers, T. & Gasevic, D. (2016). Learning analytics should not promote one size fits all: the effects of instructional conditions in predicting academic success. *The Internet and Higher Education* 28, 68–84.
- Gašević, D., Dawson, S. & Siemens, G. (2015). Let's not forget: Learning analytics are about learning. *Techtrends: Linking Research & Practice to Improve Learning*, 59(1), 64-71. doi: 10.1007/s11528-014-0822-x
- Gaskell, A. & Mills, R. (2014). The quality and reputation of open, distance and e-learning: what are the challenges? *Open Learning*, 29(3), 190-205. doi:10.1080/02680513.2014.993603
- Graesser, A. C., McNamara, D. S., & Kulikowich, J. M. (2011). Coh-Metrix providing multilevel analyses of text characteristics. *Educational Researcher*, 40(5), 223–234.
- Hillman, D. C. A., Willis, D. J., & Gunawardena, C. N. (1994). Learner-interface interaction in distance education: an extension of contemporary models and strategies for practitioners. *American Journal of Distance Education*, 8(2), 30-42.
- Ice, P., Gibson, A.M., Boston, W. & Becher, D. (2011). An Exploration of Differences between Community of Indicators in Low and High Disenrollment Online Courses *Journal of Journal of Asynchronous Learning Networks*, 15(2).
- Jisc. (2016). Learning analytics in higher education: A review of UK and international practice. Jisc: Bristol, UK: Schlater, N., Peasgood, A. & Mullan, J.
- Johnson, G. M., & Cooke, A. (2016). An ecological model of student interaction in online learning environments. In Kyei-Blankson, L., Blankson, J., Ntuli, E. & Agyeman, C. (Eds.) *Handbook of Research on Strategic Management of Interaction, Presence, and Participation in Online Courses*, pp. 1-28. Hershey, PA. doi:10.4018/978-1-4666-9582-5.ch001
- Joksimović, S., Gašević, D., Loughin, T. M., Kovanović, V. & Hatala, M. (2015). Learning at distance: Effects of interaction traces on academic achievement. *Computers & Education*, 87, 204-217. doi:10.1016/j.compedu.2015.07.002

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

- Kang, M., Liw, B. T., Kim, J. & Park, Y. (2014). Learning presence as a predictor of achievement and satisfaction in online learning environments. *International Journal on E-Learning*, 13(2), 193–208.
- Ke, F. (2010). Examining online teaching, cognitive, and social presence for adult students, *Computers & Education*, 55(2), 808-820.
- Kim, D., Park, Y., Yoon, M. & Jo, I. (2016). Toward evidence-based learning analytics: Using proxy variables to improve asynchronous online discussion environments. *The Internet and Higher Education*, 30, 30-43, ISSN 1096-7516, <http://0-dx.doi.org.aupac.lib.athabascau.ca/10.1016/j.iheduc.2016.03.002>.
- Kim, M., & Lee, E. (2012). A Multidimensional Analysis Tool for Visualizing Online Interactions. *Educational Technology & Society*, 15 (3), 89–102.
- Kitto, K., Cross, S., Waters, Z., & Lupton, M. (2015). Learning analytics beyond the LMS: the connected learning analytics toolkit. In *Proceedings of the Fifth International Conference on Learning Analytics and Knowledge* (pp. 11-15). ACM.
- Koper, R. & Tattersal, R. (Eds.). (2005). *Learning Design: A Handbook on Modelling and Delivering Networked Education and Training*. New York: Springer. ISBN 3-540-22814-4
- Kovanović, V., Gašević, D., Joksimović, S., Hatala, M. & Adesope, O. (2015). Analytics of communities of inquiry: Effects of learning technology use on cognitive presence in asynchronous online discussions. *Internet & Higher Education*, (27), 74-89. doi:10.1016/j.iheduc.2015.06.002
- Larsson, J.A. & White, B. (Eds.). (2014). *Learning analytics: From research to practice*. Springer.
- Lipman, M. (1991). *Thinking in Education*. Cambridge, UK.: Cambridge University Press.
- Lockyer, L., Bennett, S., Agostinho, S. & Harper, B. (2009). *Handbook of Research on Learning Design and Learning Objects: Issues, Applications, and Technologies*. Hershey, PA: IGI Global. doi: 10.4018/978-1-59904-861-1
- Lockyer, L., Heathcote, E. & Dawson, S. (2013). Informing pedagogical action: Aligning learning analytics with learning design. *American Behavioral Scientist*, 57, 1439–1459.
- Long, P. & Siemens, G. (2011). Penetrating the Fog: Analytics in Learning and Education. *Educause Review* 46 (5) pp. 31-40. <http://er.educause.edu/articles/2011/9/penetrating-the-fog-analytics-in-learning-and-education>
- Lowenthal, P. R. (2016). A Mixed Methods Examination of Instructor Social Presence in Accelerated Online Courses. In Kyei-Blankson, L., Blankson, J., Ntuli, E. & Agyeman,



## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

- C. (Eds.) *Handbook of Research on Strategic Management of Interaction, Presence, and Participation in Online Courses* (pp. 147-159). Hershey, PA: doi:10.4018/978-1-4666-9582-5.ch006
- Luckin, R., Clark, W. & Underwood, I. (2013). The ecology of resources: a theoretically grounded framework for designing next generation technology-rich learning. In Luckin, et al., (Eds), *Handbook of Design in Educational Technology* (pp. 33-43). New York: Routledge.
- Luyegu, E. (2015). Ensuring Presence in Online Learning Environments. *Handbook of Research on Strategic Management of Interaction, Presence, and Participation in Online Courses*, 350-376.
- Macfadyen, L. & Dawson, S. (2010). Mining LMS data to develop an "early warning system" for educators: A proof of concept. *Computers and Education*, 54 (2), 588-599. doi: [10.1016/j.compedu.2009.09.008](https://doi.org/10.1016/j.compedu.2009.09.008)
- Macfadyen, L. P., & Dawson, S. (2012). Numbers are not enough. Why e-learning analytics failed to inform an institutional strategic plan. *Educational Technology & Society*, 15 (3), 149–163.
- Manzoor, A. (2016). Role of Learning Analytics in Enhancing Teaching and Learning. In M. Anderson, & C. Gavan (Eds.) *Developing Effective Educational Experiences through Learning Analytics*, (pp. 259-281). Hershey, PA: doi:10.4018/978-1-4666-9983-0.ch011
- Masoumi, D. & Lindström, B. (2012). Quality in e-learning: a framework for promoting and assuring quality in virtual institutions. *Journal of Computer Assisted Learning*, 28(1), 27-41. doi:10.1111/j.1365-2729.2011.00440.x
- McKenney, S., & Mor, Y. (2015). Supporting teachers in data- informed educational design. *British journal of educational technology*, 46(2), 265-279.
- Mead, G.H. (1934). *Mind, self and society*. Chicago: University of Chicago Press.
- Moore, M. G. (1989). Three types of interaction. *The American Journal of Distance Education*, 3(2), 1-6.
- Moore M.G. & Kearsley G. (1996) *Distance education: A systems view*. Wadsworth Pub. Co, Belmont, CA.
- Mor, Y., & Craft, B. (2012). Learning Design: Reflections upon the current landscape. *Research in Learning Technology*, 20(1), DOI: 10.3402/rlt.v20i0.19196
- Mor, Y., Craft, B. & Hernandez-Leo, D. (2013). Editorial: The art and science of learning design. *Research in Learning Technology*, (21). ISSN 2156-7077. Available at:

- <<http://www.researchinlearningtechnology.net/index.php/rlt/article/view/22513>>. Date accessed: 14 May. 2016. doi: <http://dx.doi.org/10.3402/rlt.v21i0.22513>.
- Mor, Y., Ferguson, R. & Wasson, B. (2015). Editorial: Learning design, teacher inquiry into student learning and learning analytics: A call for action. *British Journal of Educational Technology*, 46(2), 221-229. doi:10.1111/bjet.12273
- Morris, L., Finnegan, C. and Wu, S. (2005). Tracking student behavior, persistence, and achievement in online courses. *The Internet and Higher Education*, 8 (3), pp. 221–231
- Normak, P., Pata, K., & Kaipainen, M. (2012). An Ecological Approach to Learning Dynamics. *Educational Technology & Society*, 15 (3), 262–274.
- Park, Y., Yu, J. H. & Jo, I. (2016). Clustering blended learning courses by online behavior data: A case study in a Korean higher education institute. *The Internet and Higher Education*, 29, 1-11. doi:10.1016/j.iheduc.2015.11.001
- Penick, J. E., & Harris, R. (2005). *Teaching with Purpose: Closing the Research-Practice Gap*. Arlington, VA, USA: National Science Teachers Association. Retrieved from <http://0-www.ebrary.com.aupac.lib.athabascau.ca>
- Persico, D., & Pozzi, F. (2015). Informing learning design with learning analytics to improve teacher inquiry. *British Journal of Educational Technology*, 46(2), 230-248. doi:10.1111/bjet.12207
- Phirangee, K., Demmans Epp, C., & Hewitt, J. (2016). Exploring the relationships between facilitation methods, students' sense of community and their online behaviors. *Online Learning*, 20(2), 134-154.
- Richards, G. (2011). Measuring engagement: Learning analytics in online learning. *Electronic Kazan*, 2011.
- Roblyer, M. D. & Wiencke, W. R. (2003). Design and use of a rubric to assess and encourage interactive qualities in distance courses. *American Journal of Distance Education*, 17 (2), 77-98, doi: 10.1207/S15389286AJDE1702\_2
- Rockinson-Szapkiw, A., Wendt, J., Whighting, M. & Nisbet, D. (2016). The Predictive Relationship Among the Community of Inquiry Framework, Perceived Learning and Online, and Graduate Students' Course Grades in Online Synchronous and Asynchronous Courses. *The International Review of Research in Open and Distributed Learning*, 17(3). doi:<http://dx.doi.org/10.19173/irrodl.v17i3.2203>
- Rodríguez-Triana, M. J., Martínez-Monés, A., Asensio-Pérez, J. I. & Dimitriadis, Y. (2015). Scripting and monitoring meet each other: Aligning learning analytics and learning design to support teachers in orchestrating CSCL situations. *British Journal of Educational Technology*, 46(2), 330-343. doi:10.1111/bjet.12198

## TEACHER ACTIVITIES, LEARNING DESIGN AND LEARNING ANALYTICS

- Romero, C., Ventura, S., Pechenizkiy, M., & Baker, R. S. (Eds.). (2010). *Handbook of educational data mining*. CRC Press.
- Siemens, G. (2013). Learning analytics: The emergence of a discipline. *American Behavioral Scientist*, *57*(10), 1380-1400. doi:10.1177/0002764213498851
- Siemens, G. (2013, Jan 9). *Structure and logic of the learning analytics field*. Retrieved from <http://www.learninganalytics.net/>
- Siemens, G., & Gašević, D. (2012). Special Issue on Learning and Knowledge Analytics. *Educational Technology & Society*, *15*(3), 1–2.
- Van Leeuwen, A., Janssen, J., Erkens, G., & Brekelmans, M. (2015). Teacher regulation of cognitive activities during student collaboration: Effects of learning analytics. *Computers & Education*, *90*, 80-94.
- Weller, M. & Anderson, T. (2013). Digital resilience in higher education. *European Journal of Open, Distance and e-Learning*, *16*(1) p. 53.
- Whitworth, A. & Benson, A. (2010). Learning, design, and emergence: Two case studies of Moodle in distance education. In Veletsianos, G. (Ed.). *Emerging technologies in distance education*. Edmonton: AU press.
- Zawacki-Richter, O. & Anderson, T. (Eds.). (2014). *Online distance education: Towards a research agenda*. Edmonton: AU Press
- Zhou, M., & Winne, P. H. (2012). Modeling academic achievement by self-reported versus traced goal orientation. *Learning and Instruction*, *22*(6), 413–419. doi:10.1016/j.learninstruc.2012.03.004

### Appendix A: Faculty Letter of Invitation

Date: November 8, 2016

Dear Professor,

I would like to invite you to participate in a research project that I am undertaking for my M.ED Thesis. The purpose of this study is to explore how Faculty may use student interaction data available in Moodle to assess course design and delivery in online graduate courses.

I am asking you to participate in two phases of this project.

Initially, I ask you to complete an online questionnaire which strives to determine the nature of interactions in the course you are teaching, and the sources of information you use to assess the effectiveness of planned interactions. This questionnaire should take approximately 15 minutes to complete, and you will be able to complete it at your convenience by the end of November 2016.

Lastly, I will present data from your course to you in the form of simplified interaction timelines and indicators of presence, as defined in [Garrison, Anderson and Archer's \(1999\) Community of Inquiry Model](#). A telephone interview will then be conducted to discuss these data representations with you. The goal is to obtain your in-depth perspective on the strengths and weaknesses of such data use and representation. Your experience with the dynamics of the course will be sought to compare and contrast to the data. Your time to review the data representations and participate in a recorded telephone interview is anticipated to be about 1 hour in December 2016. You will need access to the internet and an e-mail address.

If you are interested in participating, please send me an e-mail to [mtlippens@hotmail.com](mailto:mtlippens@hotmail.com) expressing your interest by November 18, 2016. I have also attached an Informed Consent Package which will provide you with the details of the study. In the meantime, you can reach me at 905-478-1124 if you have any questions. I appreciate the time and effort this will require and I would greatly appreciate your participation.

Sincerely,  
Marie Lippens  
Principal Researcher  
M.ED Student  
Athabasca University

## Appendix B: Letter of Information/Informed Consent Form

### Faculty perceptions of the use of student interaction data in online learning environments: informing teacher inquiry and learning design

November 18, 2016

**Principal Investigator (Researcher):**

Marie Lippens  
[mtlippens@hotmail.com](mailto:mtlippens@hotmail.com)  
905-478-1124

**Supervisor:**

Dr. George Siemens  
[gsiemens@athabascau.ca](mailto:gsiemens@athabascau.ca)  
1-855-212-1778

You are invited to take part in a research project entitled 'Faculty perceptions of visualized student interaction data in online learning environments: informing teacher inquiry and learning design'.

This form is part of the process of informed consent. The information presented should give you the basic idea of what this research is about and what your participation will involve, should you choose to participate. It also describes your right to withdraw from the project. In order to decide whether you wish to participate in this research project, you should understand enough about its risks, benefits and what it requires of you to be able to make an informed decision. This is the informed consent process. Take time to read this carefully as it is important that you understand the information given to you. Please contact the principal investigator, Marie Lippens if you have any questions about the project or would like more information before you consent to participate.

It is entirely up to you whether or not you take part in this research. If you choose not to take part, or if you decide to withdraw from the research once it has started, there will be no negative consequences for you now, or in the future.

**Introduction**

My name is Marie Lippens and I am a Master of Education in Distance Education student at Athabasca University. As a requirement to complete my degree, I am conducting a research project about the use of student interaction data available in Moodle to assess course design and delivery in online graduate courses. I am conducting this project under the supervision of Dr. George Siemens.

**Why are you being asked to take part in this research project?**

You are being invited to participate in this project because you are highly educated in your field with significant experience teaching online courses at the Graduate level. The teaching wisdom that you possess from your years of experience will provide rich and meaningful insight.

**What is the purpose of this research project?**

The purpose of this research project is to understand the Faculty perspective on access, use and utility of data available to Faculty in the online courses they teach. The following research questions are posed:

Research Question 1:

By engaging Faculty in the process of learning analytics, grounded in appropriate learning theory and learning design concepts, what insights and actionable items are identified?

Research Question 2:

What is the Faculty perspective of the use of learning analytics to inform ongoing course design/delivery decisions? What are the opportunities and challenges?

### **What will you be asked to do?**

First, I will ask you to complete an online questionnaire which strives to determine the nature of interactions in the course you are teaching, and the sources of information you use to assess the effectiveness of planned interactions. This questionnaire should take approximately 15 minutes to complete, and you will be able to complete it at your convenience any time until the end of November 2016.

Lastly, I will present data from your course to you in the form of simplified interaction timelines and indicators of presence, as defined in [Garrison, Anderson and Archer's \(1999\) Community of Inquiry Model](#). An audio recorded telephone interview will then be conducted to discuss these data representations with you. The interview would be arranged for a time that is convenient to your schedule. The goal is to obtain your in-depth perspective on the strengths and weaknesses of such data use and representation. Your experience with the dynamics of the course will be sought to compare and contrast to the data. Your time to review the data representations and participate in a telephone interview is anticipated to require about 1 hour in December 2016. You will need access to the internet and an e-mail address.

A follow-up conversation may be scheduled to review the interview transcript to give you an opportunity to clarify/alter your comments.

### **What are the risks and benefits?**

Faculty participants may find this research beneficial, as it may advance an understanding of the types of support faculty need to use collected data to inform decisions in their practice.

This project will highlight the Faculty perspective on the intersecting fields of learning analytics, learning design and teacher inquiry. These fields overlap in structure and function, but are lacking the unity required to make a widespread practical difference for online teachers at this time. This project is a step in this direction.

The benefits to participants might range from no benefit to a benefit in the illumination of the practical elements of a relevant quandary in their personal practice.

The risks to participants are no greater than those encountered in their everyday practice, which amount to an inconvenience to do with the time required to administer the questionnaire and subsequent telephone interview. Department permission for you to participate will be obtained.

### **Do you have to take part in this project?**

As stated earlier in this letter, involvement in this project is entirely voluntary. You may stop your participation at any stage of the questionnaire or interview process. If you request, any data collected up to that point may be removed from the study.

If you decide to withdraw from this project, there will be no consequence to you.

Data collected from your participation such as questionnaire responses and interview transcripts can be removed at any time until the end of December 2016.

**How will your privacy and confidentiality be protected?**

The ethical duty of confidentiality includes safeguarding participants' identities, personal information, and data from unauthorized access, use or disclosure.

- Participant's privacy and confidentiality will be maintained. Identifying information from questionnaire and interview responses will not be shared.
- All information will be held confidential, except when legislation or a professional code of conduct requires that it be reported.

**How will my anonymity be protected?**

Anonymity refers to protecting participants' identifying characteristics, such as name or description of physical appearance.

All data reported in this study will be kept anonymous. Every reasonable effort will be made to ensure your anonymity. You will not be identified in publications without your explicit permission.

**How will the data collected be stored?**

- A questionnaire will be administered online using the secure web survey service polldaddy.com.
- Telephone interview recordings will be stored digitally and encrypted for security.
- Telephone interview logs will be stored as hard copies in a locked filing cabinet.
- In accordance with University policy, raw data will be retained for a period of five years. After this time, digital data will be deleted and hard copy data will be shredded.
- All individual identifiers will be removed from any disseminated data or analysis. Participants will be identified in the data only by their role as Faculty.

Online questionnaire: The on-line survey company Polldaddy hosting this questionnaire is located in the United States. The US Patriot Act allows authorities to access the records of internet service providers. Therefore, anonymity and confidentiality cannot be guaranteed. If you choose to participate in this survey, you understand that your responses to the survey questions will be stored for a time (i.e. until it is transferred from that company's server to the principal researcher's computer) and may be accessed in the US during that time. The security and privacy policy for the web survey company can be found at the following link:

<https://polldaddy.com/privacy/>

**Who will receive the results of the research project?**

The results of this project will be disseminated through conference presentations, and other academic forums. These items and the completed thesis document will be shared with participants. The existence of the research will be listed in an abstract posted online at the Athabasca University Library's Digital Thesis and Project Room and the final research paper will be publicly available. Participants will be apprised of these as they become available. Please note that results reporting will include direct quotes from the interview transcripts, but your identity will remain confidential, and any identifying information will not be included.

**Who can you contact for more information or to indicate your interest in participating in the research project?**

Thank you for considering this invitation. If you have any questions or would like more information, please contact me, (the principal investigator) by e-mail [mtlippens@hotmail.com](mailto:mtlippens@hotmail.com) or telephone (905)478-1124 or my supervisor by email [gsiemens@athabascau.ca](mailto:gsiemens@athabascau.ca). If you are ready to participate in this project, please proceed to review the following consent and complete the questionnaire.

Thank you.

Marie Lippens

**This project has been reviewed by the Athabasca University Research Ethics Board. Should you have any comments or concerns regarding your treatment as a participant in this project, please contact the Research Ethics Office by e-mail at [rebsec@athabascau.ca](mailto:rebsec@athabascau.ca) or by telephone at 1-800-788-9041, ext. 6718.**

**Informed Consent:**

By completing this questionnaire you agree that:

1. You have read what this research project is about and understood the risks and benefits.
2. You have had time to think about participating in the project and had the opportunity to ask questions and have those questions answered to your satisfaction.
3. You understand that you are free to withdraw participation from the project by closing your browser window or navigating away from this page, without having to give a reason and that doing so will not affect you now or in the future.
4. You understand that if you choose to withdraw, you may request that your data be removed from the project by contacting the principal investigator before December 31, 2016.

Please retain a copy of this consent information for your records.

**Clicking “start questionnaire” below and submitting this questionnaire constitutes your consent and implies your agreement to the above statements.**

[Start Questionnaire](#)



## Appendix C: Ethics Approval Letter



October 11, 2016

Ms. Marie Lippens  
Centre for Distance Education\Master of Education in Distance Education  
Athabasca University

File No: 22334

### Ethics Expiry Date: October 10, 2017

Dear Marie Lippens,

Thank you for your recent resubmission to the Centre for Distance Education Departmental Ethics Review Committee, addressing the clarifications and revisions requested for your research entitled, 'Faculty perceptions of the use of student interaction data in online learning environments: informing teacher inquiry and learning design'.

Your application has been **Approved** and this memorandum constitutes a *Certification of Ethics Approval*. It is noted that you will require AU Institutional Permission and this request has been initiated for you. **Please note that the research cannot proceed until institutional permission has been granted.**

Q 3.7 needs to also have recognition of the codes being used to anonymize data collected and link different forms of participant data. *This change has been noted on your ethics file.*

Collegial comment: on the informed consent information letter, the program is the MEd (DE) not MDE.

This REB approval, dated October 11, 2016, is valid for one year less a day.

Throughout the duration of this REB approval, all requests for modifications, ethics approval renewals and serious adverse event reports must be submitted via the Research Portal.

To continue your proposed research beyond October 10, 2017, you must apply for renewal by completing and submitting an Ethics Renewal Request form. Failure to apply for **annual renewal** before the expiry date of the current certification of ethics approval may result in the discontinuation of the ethics approval and formal closure of the REB ethics file. Reactivation of the project will normally require a new Application for Ethical Approval and internal and external funding administrators in the Office of Research Services will be advised that ethical approval has expired and the REB file closed.

**When your research is concluded**, you must submit a Project Completion (Final) Report to close out REB approval monitoring efforts. Failure to submit the required final report may mean that a future application for ethical approval will not be reviewed by the Research Ethics Board until such time as the outstanding reporting has been submitted.

At any time, you can login to the Research Portal to monitor the workflow status of your application.

If you encounter any issues when working in the Research Portal, please contact the system administrator at [research\\_portal@athabascau.ca](mailto:research_portal@athabascau.ca).

Sincerely,

Debra Hoven  
Chair, Centre for Distance Education Departmental Ethics Review Committee  
Athabasca University Research Ethics Board

## Appendix D: Letter of Institutional Permission

**Subject:** Institutional Permission, Ethics File #22334



October 18, 2016

Ms. Marie Lippens  
 Centre for Distance Education\Master of Education in Distance Education  
 Athabasca University

Dear Marie Lippens,

I have reviewed your request for Institutional Permission to access resources for research purposes. I am pleased to advise that your request to access Athabasca University staff or students (or their data under the care and control of the University) or resources to conduct your research project entitled 'Faculty perceptions of the use of student interaction data in online learning environments: informing teacher inquiry and learning design' has been **approved**.

As outlined in your approved ethics application (excerpts from Tabs 2, 3, 6 and 7 below), you are seeking assistance to access, for research purposes, the following:

### Tab 2. Data Collection

2.4 If this project involves secondary use of data, list all original sources. "Student activity data will be sourced from Faculty participant's courses. The course(s) have been selected to be two or three of the core courses in Athabasca University's Master of Education in Distance Education program. A complete set of logged course data from the LMS (Moodle) will be exported as excel and text files. User data will be anonymized before analysis and confidential information will be obscured. Important information to be drawn from the log files includes a timeline of course resources and activities, access logs and all communications between users including faculty-posted content and discussion forum discourse. All log data will be securely stored and original export files will be encrypted for security."

### Tab 3. Data Identifiers

3.1 What identifiable information will you be collecting? "Surname and First Name|Telephone Number|Email Address"

### Tab 6. Participant Information

6.1 Who are you studying? "Faculty teaching core courses in the Master of Education in Distance Education program at Athabasca University"

6.2 Describe the inclusion criteria. "Faculty must have at least three years' experience teaching online graduate-level courses, and they have been teaching the course under study for at least one year prior to this study. These criteria ensure that Faculty have sufficient experience teaching online to openly discuss online learning principles, and that they have enough experience with the individual course under study to provide a rich, reflective perspective to the data."

6.5 How many participants do you hope to recruit? "2-3"

### Tab 7. Recruitment

7.1 Describe how you will identify potential participants. "Faculty have been identified based on the inclusion criteria for this study: must have at least three years' experience teaching online graduate-level courses, and that they have been teaching the course under study for at least one year prior to this study. Only Faculty teaching one or more of the core Master of Education courses at Athabasca University will be considered."

7.2 Once you have identified a list of potentially eligible participants, indicate how the potential participants' names will be passed on to the researchers. "I plan to approach potential participants who I have identified, and provide information about my research through email."

I wish you every success with your research project.

Dr. Donna Romyn  
Associate Vice-President Research  
Athabasca University

## Appendix E: Faculty Interview Plan

### Overview of interview goals

The purpose of this interview is to assess the Faculty perspective of the learning analytics visualizations and how they may inform teacher inquiry and learning design.

Interview goals:

- Elicit Faculty's first impression of the visualizations
- Obtain Faculty interpretation of each visualization with elaborations on learning design and course delivery parameters
- Gauge Faculty's opinion on the utility of the data
- Encourage Faculty to express their needs, wishes and opinions and concerns regarding data access, data handling, technological and time issues

### Instructions for respondents

- Thank you for agreeing to participate in this interview.
- I would like to remind you that your answers will remain confidential, and will be used for the sole purpose of this research project.
- Our conversation today will be recorded for in-depth analysis.
- Please let me know if you have any questions, concerns or would like clarification at any time.
- You are under no obligation to complete this interview, and you may terminate our conversation at any time.

**Interview outline**

- Remind respondent that recording will begin
- Introduction
  - Greet interviewee
  - Explain the purpose of the interview
  - Establish cultural ignorance (interviewer as learner)
  - Ask respondent if they have any questions
  
- Interview Strategies
  - Friendly conversation
  - Remain neutral
  - Encourage expansion of answers
    - Use open-ended questions
    - Repeat respondent's answer (echo probe)
    - Silent probe/Uh-huh probe
    - Use interviewee's own language to ask subsequent questions
  
- Leading Questions
  - What is your first impression of the learning analytics visualizations provided to you?
  - Lead me through your interpretation of each visualization
    - What do you see with respect to course design elements?
    - What do you see with respect to course delivery elements?
  - Do these visualizations reveal any information that you may find useful in your practice?
  - What would you say are your needs or wishes regarding the use of learning analytics data from your course(s)?
  - Do you have any concerns about obtaining and using learning analytics data from your course(s)?
  - Would the use of learning analytics data require a change in the way you currently access and handle students' confidential information?
  - Do you feel that you have all of the technological tools and expertise to make the best use of learning analytics data from your course(s)?
  - Can you comment on how the use of learning analytics data might impact the time you spend on other tasks related to teaching this course?



**Interviewer:** \_\_\_\_\_

**Interview Date:** \_\_\_\_\_

**Interviewee:** \_\_\_\_\_

**Themes**

---

---

---

---

---

---

---

---

**Impressions**

---

---

---

---

---

---

---

---

---

---

---

**Interview End Time:** \_\_\_\_\_

## Appendix G: Preliminary Faculty Questionnaire

### Preliminary Faculty Questionnaire

1. How would you describe the interactions that occur most often throughout this course?
  - A. Rank from most frequent to least frequent
    - Social interactions
    - Instructional interactions
    - Technological interactions
  - B. Rank from most frequent to least frequent
    - Learner-driven
    - Teacher-driven
  
2. In your opinion, does this course provide opportunities for students to experience the following (choose all that apply)
  - Social presence
  - Cognitive presence
  - Teaching presence
  - I don't know
  
3. In your opinion, do underperforming students tend to be missing any of these experiences?
 

If so, which one(s) (choose all that apply)

  - Social presence
  - Cognitive presence
  - Teaching presence
  - I don't know
  
4. In terms of iterative course improvements, what information source(s) influence your decision making process? For each source that you select, rate to what degree the source is used, where 1 = used heavily; 5 = used lightly
 

<input type="radio"/> Literature – pedagogy	1	2	3	4	5
<input type="radio"/> Literature – design	1	2	3	4	5
<input type="radio"/> Literature – technology	1	2	3	4	5
<input type="radio"/> Feedback - students	1	2	3	4	5
<input type="radio"/> Feedback – institutional	1	2	3	4	5
<input type="radio"/> Observations - student behaviours	1	2	3	4	5
<input type="radio"/> Student performance	1	2	3	4	5
<input type="radio"/> Best practice as shared with colleagues	1	2	3	4	5



- Experience and intuition 1 2 3 4 5
- Learning analytics data 1 2 3 4 5
- Other 1 2 3 4 5
- Other 1 2 3 4 5

5. In your opinion, are the learning activities in this course generally used by students as intended? (Y/N)

Please comment \_\_\_\_\_

6. In your opinion, do learners in the course generally express an understanding of the value of collaborative activities? (Y/N)

Please comment \_\_\_\_\_

7. Do you feel that you are able to identify disconnected or at-risk learning behaviours early in the course? (Y/N)

Please comment \_\_\_\_\_

8. Have you accessed Moodle data from your course in the past 6 months? (Y/N)

If Yes, how often do you access this data? \_\_\_\_\_

For what purpose did you access this data? \_\_\_\_\_

9. Have you ever used any visualization tools with your course data? (Y/N)

If Yes:

Please list which tools you used

\_\_\_\_\_

What was the purpose of the visualization?

\_\_\_\_\_

Was the visualization helpful? Please comment

\_\_\_\_\_

Appendix H: Faculty Questionnaire Responses

Question  
**02**

How would you describe the interactions that occur most often throughout your course? Rank from most frequent to least frequent.

Answers  
**2**  
100%

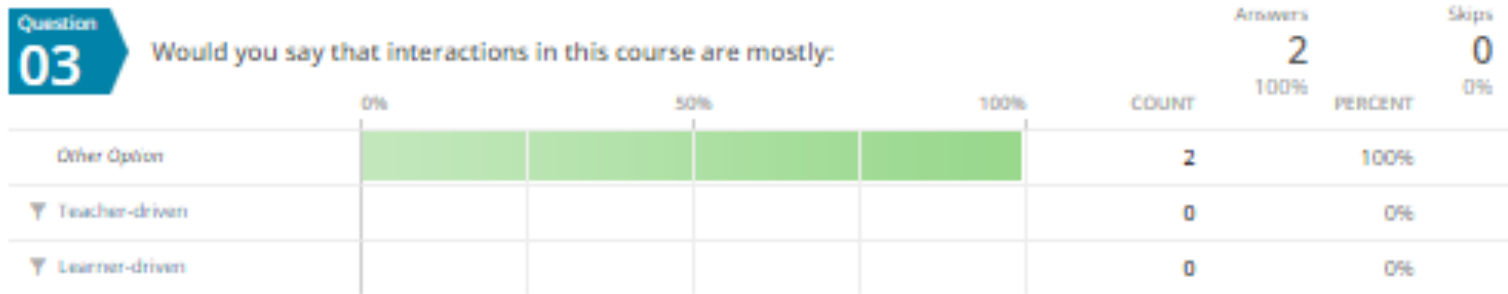
Skips  
**0**  
0%

RANK	CHOICE	WEIGHTED RANK	0	3
1	Social Interactions	2.00	<div style="width: 100%; height: 15px; background-color: #92d050;"></div>	
2	Technological Interactions	2.00	<div style="width: 100%; height: 15px; background-color: #92d050;"></div>	
3	Instructional Interactions	2.00	<div style="width: 100%; height: 15px; background-color: #92d050;"></div>	

Note: The weighted rank is calculated as:  $(\text{sum of } (\text{position} * \text{count}) \text{ for each choice} / \text{total responses}) + 1$

Detailed Data

	1	2	3
Social Interactions	—	2 (100.0%)	—
Technological Interactions	1 (50.0%)	—	1 (50.0%)
Instructional Interactions	1 (50.0%)	—	1 (50.0%)



[All Answers](#)
[Popular Answers](#)
[Popular Words](#)

Other Responses

Answers  
**2**

- Both

166,660,856

Tuesday, Nov 8th 4:54PM
- Both - probably tied.

165,548,353

Thursday, Oct 27th 1:32PM

Please help me understand why you selected this answer

Comments  
**2**

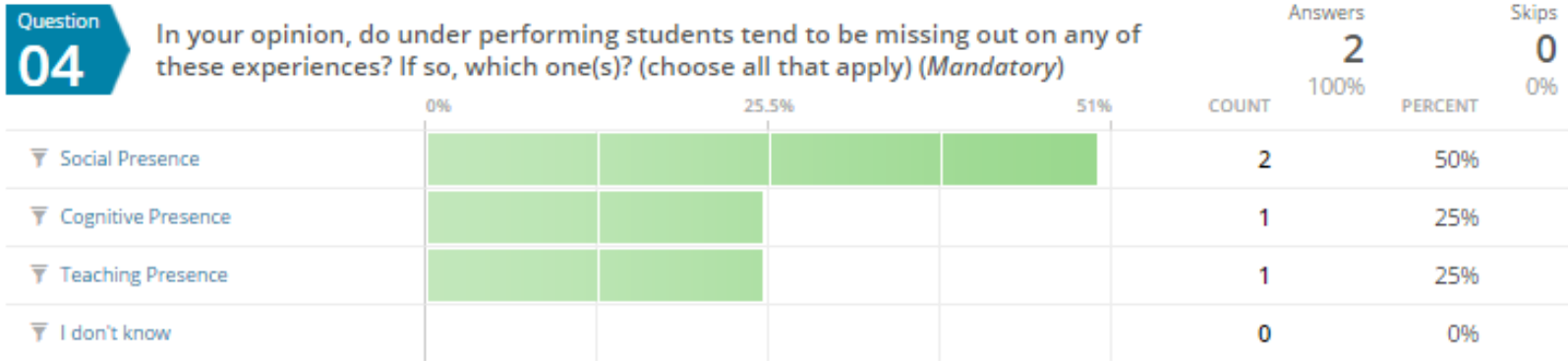
- Initially I encourage students to Skype with me. Once a rapport has been set then often students continue to call or text me. So initially teacher-driven, but then becomes learner-driven.

166,660,856

Tuesday, Nov 8th 4:54PM
- I post weekly newsletters, plus added information on readings, Youtube links etc. I initiate much of the dialogue in this way. However within the regular discussion forums students are very participatory and initiate the various streams of the discussion. They also work together on collaborative assignments.

165,548,353

Thursday, Oct 27th 1:32PM



Please help us understand why you selected this answer

Comments 2

166,660,856 Under performing students tend to want to read the content and complete assignments with no or little interaction on Moodle. Tuesday, Nov 8th 4:54PM

165,548,353 Students who are under-performing are not often readily able to participate with group work as they fall behind, and they therefore lack interaction within the social milieu of the course. They also tend to fall behind cognitively. Thursday, Oct 27th 1:32PM

**Question**  
**05**

In terms of iterative course improvements, what information source(s) influence your decision making process? For each source that you select, rate to what degree the source is used, where 1 = used heavily; 5 = used lightly

Answers  
**2**  
100%

Skips  
**0**  
0%

Heat Map  Bar Chart

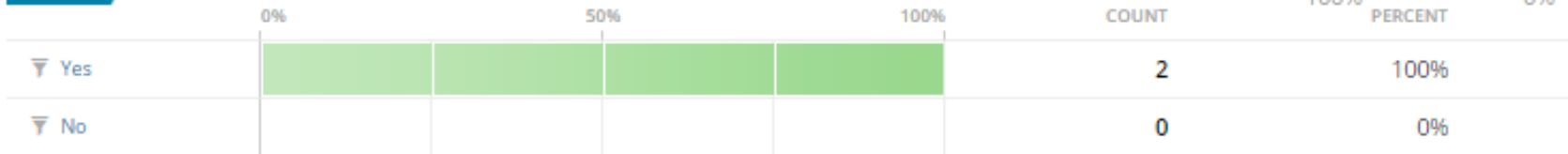
Values  Percent

	-1-	-2-	-3-	-4-	-5-	NOT USED AT ALL
Literature (Pedagogy)	2	0	0	0	0	0
Literature (design)	2	0	0	0	0	0
Literature (technology)	0	1	1	0	0	0
Feedback (students)	1	1	0	0	0	0
Feedback (institutional)	0	0	2	0	0	0
Observations (student behaviours)	1	1	0	0	0	0
Student performance	0	2	0	0	0	0
Best practice as shared with colleagues	0	0	1	1	0	0
Experience and intuition	2	0	0	0	0	0
Learning analytics	0	1	1	0	0	0
Other	0	0	0	0	0	0

**Question**  
**06**


In your opinion, are the learning activities in this course generally used by students as intended?


Answers **2** Skips **0**  
100% PERCENT 0%



Please help me understand why you selected this answer

Comments **2**

- 

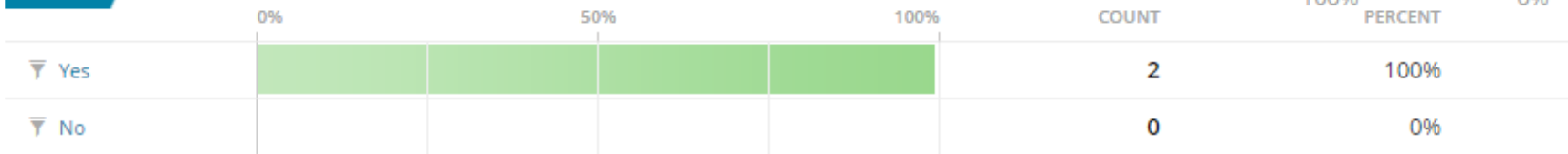
166,660,856 Activities, videos, and readings are often mentioned in forum posts or in Skype conversations. Tuesday, Nov 8th 4:54PM
- 

165,548,353 The course activities are very clearly delineated with outcomes noted, so students receive clear direction on the whys and hows of the various activities. Thursday, Oct 27th 1:32PM

**Question 07**

In your opinion, do learners in the course generally express an understanding of the value of collaborative activities?

Answers **2** Skips **0**  
 100% PERCENT 0%



Please help me understand why you selected this answer

Comments **2**

- 166,660,856

Most students interact regularly. If a student does not I call or email them to work out a solution. Often ones not participating have some form of mental disability and we can work out a compromise that works for the student.

Tuesday, Nov 8th 4:54PM
- 165,548,353

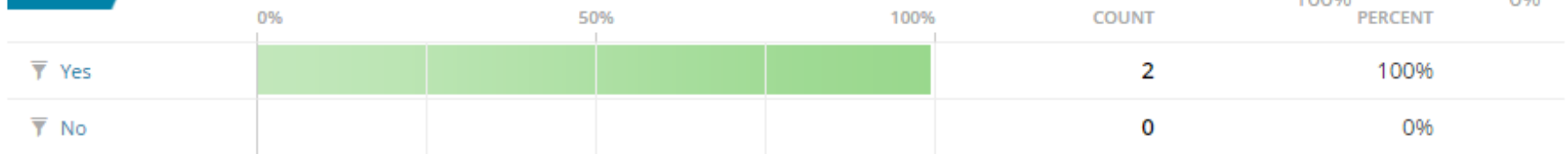
Most students appreciate the collaborative learning experiences provided and see their true value after the fact.

Thursday, Oct 27th 1:32PM

Question  
**08**


Do you feel that you are able to identify disconnected or at-risk learning behaviours early in the course?

Answers **2** Skips **0**  
100% 0%




Please help me understand why you selected this answer

Comments  
**2**

- 

166,660,856

I can usually read between the lines in their initial introductory post and can foresee social issues that need to be addressed.

Tuesday, Nov 8th 4:54PM
- 

165,548,353

Just checking on participant access frequency and posting to forums early on are indicators of involvement. I tend to check on students who seem to be mostly uninvolved after the first two weeks, personally, via email and see if they need any assistance.

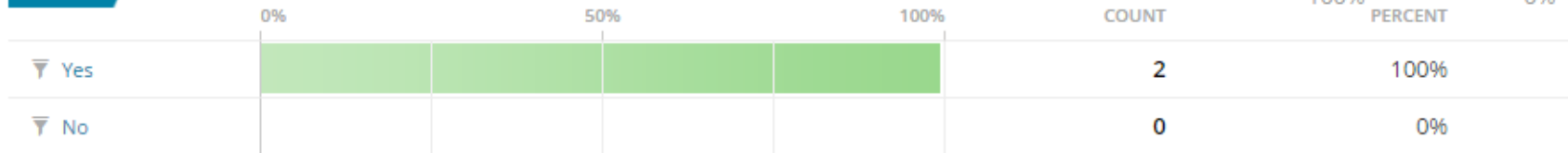
Thursday, Oct 27th 1:32PM



**Question 09**

Have you accessed Moodle activity log data from your course in the past 6 months?

Answers **2** Skips **0**  
100% 0%



If you answered yes, how often do you access Moodle activity log data and for what purpose?

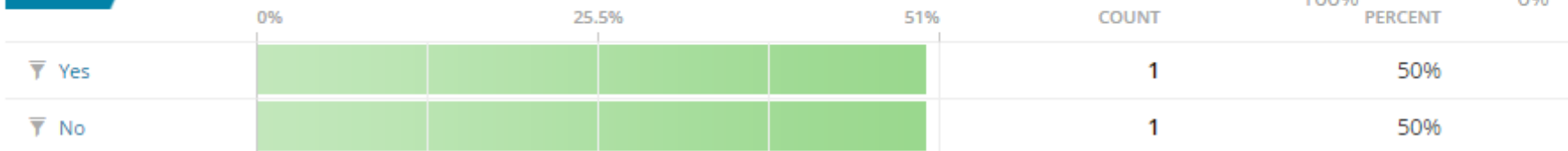
Comments **1**

165,548,353 I check about every two weeks throughout the semester. It apprises me of student involvement and participation rates, and progress generally. Thursday, Oct 27th 1:32PM

**Question 10**

Have you ever used any visualization tools with your course data?

Answers **2** Skips **0**  
100% 0%



If yes, please list which tools you used:

Comments **1**

165,548,353 Concept mapping. Thursday, Oct 27th 1:32PM

### Appendix I: Community of Inquiry Coding Template

#### Community of Inquiry Coding Template

<b>Elements</b>	<b>Categories</b>	<b>Indicators (examples only)</b>
Cognitive Presence	Triggering Event	Sense of puzzlement
	Exploration	Information exchange
	Integration	Connecting ideas
	Resolution	Apply new ideas
Social Presence	Emotional Expression	Emoticons
	Open Communication	Risk-free expression
	Group Cohesion	Encouraging collaboration
Teaching Presence	Instructional Management	Defining & initiating discussion topics
	Building Understanding	Sharing personal meaning
	Direct Instruction	Focusing discussion

(Garrison, Anderson, & Archer, 2000, p. 4)

**Appendix J: Course 1 Discussion Forum Analysis – Elements of the CoI**

Table J1

*Quantified indicators of the elements of CoI in each discussion forum. Course 1, iteration 1*

	Disc Forum 1	Disc Forum 2	Disc Forum 3	Disc Forum 4	Disc Forum 5	Disc Forum News	Disc Forum Social
Cognitive Presence	142	51	47	70	61	0	4
Exploration	30	3	16	32	12	0	2
Integration	93	40	27	29	40	0	0
Resolution	11	4	0	2	5	0	0
Triggering Event	35	9	6	16	5	0	2
Social Presence	99	38	28	43	13	3	34
Emotional Expression	7	8	8	4	2	2	8
Group Cohesion	47	20	17	18	8	1	29
Open Communication	50	10	13	22	4	0	0
Teaching Presence	31	19	6	11	2	31	11
Building Understanding	24	17	2	11	2	6	3
Direct Instruction	2	0	3	0	0	5	4
Instructional Management	5	2	2	0	0	20	4

Table J2

*Quantified indicators of the elements of CoI in each discussion forum. Course 1, iteration 2*

	Disc Forum 1	Disc Forum 2	Disc Forum 3	Disc Forum 4	Disc Forum 5	Disc Forum News	Disc Forum Social
Cognitive Presence	107	67	31	20	8	0	9
Exploration	36	21	13	7	5	0	7
Integration	50	38	17	8	4	0	0
Resolution	7	3	0	2	0	0	0
Triggering Event	25	14	7	4	0	0	2
Social Presence	39	55	16	11	9	8	18
Emotional Expression	11	15	8	2	3	7	3
Group Cohesion	13	22	3	5	4	1	13
Open Communication	18	25	7	4	4	0	10
Teaching Presence	20	10	6	0	1	36	3
Building Understanding	19	10	5	0	1	3	0
Direct Instruction	0	0	1	0	0	13	2
Instructional Management	1	0	0	0	0	21	1

Table J3

*Quantified indicators of the elements of CoI in each discussion forum. Course 1, iteration 3*

	Disc Forum 1	Disc Forum 2	Disc Forum 3	Disc Forum 4	Disc Forum 5	Disc Forum News	Disc Forum Social
Cognitive Presence	151	66	23	29	3	0	0
Exploration	64	20	10	11	1	0	0
Integration	73	43	9	9	1	0	0
Resolution	3	0	2	1	0	0	0
Triggering Event	24	10	3	9	1	0	0
Social Presence	103	22	12	14	0	1	4
Emotional Expression	17	3	7	4	0	1	0
Group Cohesion	46	10	4	6	0	0	4
Open Communication	52	9	3	6	0	0	0
Teaching Presence	24	14	9	0	0	22	0
Building Understanding	21	14	9	0	0	2	0
Direct Instruction	0	0	0	0	0	12	0
Instructional Management	4	1	0	0	0	10	0

## Appendix K: Course 2 Discussion Forum Analysis – Elements of the CoI

Table K1

*Quantified indicators of the elements of CoI in each discussion forum. Course 2, iteration 1*

	Disc Forum 1	Disc Forum 2	Disc Forum 3	Disc Forum 4	Disc Forum 5	Disc Forum 6	Disc Forum 7	Disc Forum 8	Disc Forum 9	Disc Forum Intro	Disc Forum News
Cognitive Presence	34	17	39	24	22	9	14	15	5	26	0
Exploration	13	3	16	12	13	4	11	10	4	20	0
Integration	19	13	24	11	8	5	4	5	2	5	0
Resolution	0	1	0	0	0	0	0	0	0	0	0
Triggering Event	6	1	3	1	2	0	0	1	0	1	0
Social Presence	24	12	37	12	18	5	4	7	6	76	0
Emotional Expression	5	1	11	5	6	2	1	2	0	29	0
Group Cohesion	3	7	13	6	6	3	1	1	3	15	0
Open Communication	18	5	19	3	8	0	3	4	3	59	0
Teaching Presence	2	3	4	2	3	2	1	2	1	10	3
Building Understanding	0	1	1	1	2	1	0	0	0	7	0
Direct Instruction	1	0	1	0	0	0	0	1	0	2	2
Instructional Management	1	2	2	1	1	1	1	1	1	1	1

Table K2

*Quantified indicators of the elements of CoI in each discussion forum. Course 2, iteration 2*

	Disc Forum 1	Disc Forum 2	Disc Forum 3	Disc Forum 4	Disc Forum 5	Disc Forum 6	Disc Forum 7	Disc Forum 8	Disc Forum 9	Disc Forum Intro	Disc Forum News
Cognitive Presence	89	35	71	44	61	25	16	3	3	3	46
Exploration	28	10	29	19	27	13	8	1	1	3	33
Integration	45	22	32	20	25	9	9	2	2	0	10
Resolution	3	1	4	3	1	1	0	0	0	0	0
Triggering Event	19	5	11	3	11	2	1	0	0	0	3
Social Presence	73	17	43	8	23	14	8	1	1	7	125
Emotional Expression	11	4	12	3	6	2	2	0	0	0	42
Group Cohesion	19	5	11	4	7	6	0	0	0	7	17
Open Communication	54	10	28	1	15	7	6	1	1	0	93
Teaching Presence	5	4	9	6	4	3	1	0	0	0	4
Building Understanding	4	3	8	3	3	2	1	0	0	0	3
Direct Instruction	0	0	0	1	0	0	0	0	0	0	1
Instructional Management	1	1	1	2	1	1	0	0	0	0	0

## Appendix L: Course 1 CoI Presence per User

Table L1-1

*Quantified indicators of the elements of CoI per User. Course 1, iteration 1 (Users 2-10)*

	Anon User 2*	Anon User 3*	Anon User 4	Anon User 5	Anon User 6	Anon User 7	Anon User 8	Anon User 9	Anon User 10
Cognitive Presence	5	4	16	38	21	19	30	27	19
Exploration	0	3	2	19	4	7	6	4	8
Integration	3	0	10	13	13	11	22	18	10
Resolution	0	0	2	1	2	0	2	4	0
Triggering Event	2	2	4	6	5	4	4	9	3
Social Presence	17	3	8	29	18	15	15	17	9
Emotional Expression	6	1	1	3	4	1	1	1	2
Group Cohesion	10	2	4	19	8	8	9	6	5
Open Communication	1	0	4	8	7	8	5	10	2
Teaching Presence	83	27	0	0	0	0	0	0	0
Building Understanding	48	16	0	0	0	0	0	0	0
Direct Instruction	10	4	0	0	0	0	0	0	0
Instructional Management	25	8	0	0	0	0	0	0	0

*\*Co-instructed by User 2 and User 3*

Table L1-2

*Quantified indicators of the elements of CoI per User. Course 1, iteration 1 (Users 11-19)*

	Anon User 11	Anon User 12	Anon User 13	Anon User 14	Anon User 15	Anon User 16	Anon User 17	Anon User 18	Anon User 19
Cognitive Presence	22	37	13	8	26	12	5	31	40
Exploration	4	9	3	3	4	1	1	9	6
Integration	17	25	8	5	17	9	4	14	30
Resolution	1	0	1	1	1	1	0	5	1
Triggering Event	0	5	1	1	7	3	1	6	9
Social Presence	12	26	9	4	19	7	3	15	30
Emotional Expression	3	4	4	0	2	1	1	0	3
Group Cohesion	6	16	5	0	13	3	0	8	17
Open Communication	5	9	2	4	7	5	2	7	13
Teaching Presence	0	0	0	0	0	0	0	1	0
Building Understanding	0	0	0	0	0	0	0	1	0
Direct Instruction	0	0	0	0	0	0	0	0	0
Instructional Management	0	0	0	0	0	0	0	0	0



Table L2-1

*Quantified indicators of the elements of CoI per User. Course 1, iteration 2 (Users 2-9)*

	Anon User 2*	Anon User 3	Anon User 4	Anon User 5*	Anon User 6	Anon User 7	Anon User 8	Anon User 9
Cognitive Presence	0	20	21	3	1	15	16	12
Exploration	0	6	7	0	0	10	7	2
Integration	0	9	13	1	1	3	7	10
Resolution	0	1	1	0	0	0	1	0
Triggering Event	0	4	3	2	0	3	1	0
Social Presence	14	12	10	5	0	8	3	10
Emotional Expression	9	3	3	1	0	0	0	3
Group Cohesion	3	5	4	4	0	4	2	4
Open Communication	4	6	5	0	0	5	1	3
Teaching Presence	56	0	0	20	0	0	0	0
Building Understanding	25	0	0	13	0	0	0	0
Direct Instruction	13	0	0	3	0	0	0	0
Instructional Management	19	0	0	4	0	0	0	0

*\*Co-instructed by User 2 and User 5*

Table L2-2

*Quantified indicators of the elements of CoI per User. Course 1, iteration 2 (Users 10-17)*

	Anon User 10	Anon User 11	Anon User 12	Anon User 13	Anon User 14	Anon User 15	Anon User 16	Anon User 17
Cognitive Presence	50	8	36	16	6	4	3	30
Exploration	15	2	11	10	1	1	3	14
Integration	22	5	19	3	3	2	0	18
Resolution	1	0	4	0	1	1	0	2
Triggering Event	18	3	7	3	1	0	0	7
Social Presence	24	2	31	16	1	2	3	15
Emotional Expression	8	0	17	1	0	0	0	4
Group Cohesion	13	1	9	6	0	1	1	4
Open Communication	10	1	9	10	1	2	3	8
Teaching Presence	0	0	0	0	0	0	0	0
Building Understanding	0	0	0	0	0	0	0	0
Direct Instruction	0	0	0	0	0	0	0	0
Instructional Management	0	0	0	0	0	0	0	0

Table L3-1

*Quantified indicators of the elements of CoI per User. Course 1, iteration 3 (Users 2-13)*

	Anon User 2*	Anon User 3	Anon User 4	Anon User 5	Anon User 6*	Anon User 7	Anon User 8	Anon User 9	Anon User 10	Anon User 11	Anon User 12	Anon User 13
Cognitive Presence	3	11	6	30	0	8	24	23	23	24	3	11
Exploration	1	5	3	5	0	4	6	12	12	7	2	2
Integration	0	6	2	22	0	5	11	11	10	12	0	9
Resolution	0	1	0	0	0	0	2	0	0	0	0	0
Triggering Event	2	3	1	5	0	2	6	1	1	5	1	0
Social Presence	9	8	1	20	0	8	7	11	6	16	1	5
Emotional Expression	5	1	0	2	0	1	2	3	3	4	0	1
Group Cohesion	4	2	1	15	0	3	3	6	1	9	0	3
Open Communication	0	6	0	4	0	5	3	6	2	8	1	1
Teaching Presence	60	0	0	0	8	0	0	0	0	0	0	0
Building Understanding	45	0	0	0	0	0	0	0	0	0	0	0
Direct Instruction	6	0	0	0	6	0	0	0	0	0	0	0
Instructional Management	12	0	0	0	3	0	0	0	0	0	0	0

*\*Co-instructed by User 2 and User 6*

Table L3-2

*Quantified indicators of the elements of CoI per User. Course 1, iteration 3 (Users 14-24)*

	Anon User 14	Anon User 15	Anon User 16	Anon User 17	Anon User 18	Anon User 19	Anon User 20	Anon User 21	Anon User 22	Anon User 23	Anon User 24
Cognitive Presence	6	11	6	6	22	8	20	7	7	6	7
Exploration	3	4	4	3	9	4	8	2	3	3	4
Integration	3	7	2	3	6	3	9	4	4	3	3
Resolution	0	0	0	0	1	0	1	0	0	1	0
Triggering Event	0	1	0	0	7	3	5	1	2	1	0
Social Presence	6	5	6	7	9	3	12	3	6	4	3
Emotional Expression	4	0	0	2	1	0	3	0	0	0	0
Group Cohesion	1	3	3	3	2	2	3	0	5	0	1
Open Communication	2	2	4	2	7	1	6	3	1	4	2
Teaching Presence	0	1	0	0	0	0	0	0	0	0	0
Building Understanding	0	1	0	0	0	0	0	0	0	0	0
Direct Instruction	0	0	0	0	0	0	0	0	0	0	0
Instructional Management	0	0	0	0	0	0	0	0	0	0	0

## Appendix M: Course 2 CoI Presence per User

Table M1

*Quantified indicators of the elements of CoI per User. Course 2, iteration 1*

	Anon User 1	Anon User 2	Anon User 3	Anon User 4	Anon User 5	Anon User 6	Anon User 7	Anon User 8	Anon User 9*	Anon User 10	Anon User 11	Anon User 12	Anon User 13
Cognitive Presence	28	7	3	21	6	30	0	29	5	22	11	1	41
Exploration	16	5	2	11	4	10	0	16	5	15	7	1	14
Integration	9	3	1	10	2	16	0	13	0	7	4	0	30
Resolution	0	0	0	0	0	0	0	0	0	0	0	0	1
Triggering Event	3	1	1	1	0	4	0	1	0	3	0	0	1
Social Presence	28	10	2	27	4	23	2	26	19	20	5	4	31
Emotional Expression	6	2	1	7	0	8	1	6	13	9	1	3	5
Group Cohesion	9	1	0	11	0	4	0	8	4	8	1	1	11
Open Communication	15	9	2	14	4	17	1	17	5	11	4	2	21
Teaching Presence	0	0	0	0	0	0	0	0	33	0	0	0	0
Building Understanding	0	0	0	0	0	0	0	0	13	0	0	0	0
Direct Instruction	0	0	0	0	0	0	0	0	7	0	0	0	0
Instructional Management	0	0	0	0	0	0	0	0	13	0	0	0	0

*\*Instructed by User 9*

Table M2-1

*Quantified indicators of the elements of CoI per User. Course 2, iteration 2 (Users 2-12)*

	Anon User 2	Anon User 3	Anon User 4	Anon User 5*	Anon User 6	Anon User 7	Anon User 8	Anon User 9*	Anon User 10	Anon User 12
Cognitive Presence	33	9	3	19	32	38	11	6	24	14
Exploration	10	5	2	7	15	16	5	5	12	8
Integration	15	4	1	7	15	20	4	1	11	4
Resolution	2	0	0	1	0	0	1	0	0	0
Triggering Event	7	0	0	5	3	5	1	0	1	2
Social Presence	19	8	1	10	26	21	15	23	13	14
Emotional Expression	4	1	1	0	4	5	2	17	0	2
Group Cohesion	7	4	0	3	5	6	4	4	1	0
Open Communication	11	3	1	8	19	13	12	11	12	14
Teaching Presence	0	0	0	0	0	0	0	37	0	0
Building Understanding	0	0	0	0	0	0	0	26	0	0
Direct Instruction	0	0	0	0	0	0	0	2	0	0
Instructional Management	0	0	0	0	0	0	0	9	0	0

*\*Instructed by User 9; visiting interns User 5 and User 14*

Table M2-2

*Quantified indicators of the elements of CoI per User. Course 2, iteration 2 (Users 13-21)*

	Anon User 13	Anon User 14*	Anon User 15	Anon User 16	Anon User 17	Anon User 18	Anon User 19	Anon User 20	Anon User 21
Cognitive Presence	28	4	20	16	26	22	55	22	11
Exploration	12	3	8	6	8	10	17	13	8
Integration	13	1	8	10	14	15	21	8	3
Resolution	3	0	2	1	0	0	2	1	0
Triggering Event	1	0	5	2	4	0	18	0	1
Social Presence	19	8	15	19	14	18	38	22	14
Emotional Expression	3	3	3	2	3	8	12	8	3
Group Cohesion	2	3	8	3	2	1	15	5	2
Open Communication	16	6	4	15	12	13	22	10	12
Teaching Presence	0	2	0	0	0	0	1	0	0
Building Understanding	0	1	0	0	0	0	0	0	0
Direct Instruction	0	0	0	0	0	0	0	0	0
Instructional Management	0	1	0	0	0	0	1	0	0

*\*Instructed by User 9; visiting interns User 5 and User 14*

**Appendix N: Faculty 1 Interview Transcript**

Transcript – Telephone interview with <Faculty 1>

January 6, 2017

Start: 12:30pm

Interviewer: Am I sounding clear?

Faculty 1: Yes

Interviewer: OK, fantastic. Now, maybe I should get some formalities out of the way...Um...your answers are confidential for this interview, so anything that I do write about in my thesis will not have your identifying information or the name of your course associated with your comments.

Faculty 1: Yes

Interviewer: So you know that you can terminate our conversation at any time and stop me if you have any questions or concerns.

Faculty 1: Yes

Interviewer: OK, thank you so much. Do you have any questions to begin with?

Faculty 1: No, I'm fine.

Interviewer: OK, great, well let's just jump in, I know your time is precious and it is the start of a new semester so all of the busy-ness that comes with that is probably on top of you.

Faculty 1: That's right. Yup.

Interviewer: OK, so I want to kind of walk you back through all of that data and I guess my first question is, when you look at those, um, tables from those courses which discuss the community of inquiry and try to quantify the elements of community of inquiry as well as total course activity, um, I wanted to know what your first impression is. What are your first thoughts when you look at it?



Faculty 1: I guess the, uh, I had trouble in some ways at some times understanding. There seemed to be a fair amount of repetitive data, so I wasn't sure what the numbers were referring to in some cases, from one column to the next and things like that, but overall my first impression was it seemed fairly, if I look at it from the point of view of, uh, the forums especially and things like that, it seemed probably to reflect our course a fair amount, the way the numbers added up.

Interviewer: OK, that's good. So when you say it reflected your course, do you mean the course design, like the activity patterns seemed to follow how you designed the course?

Faculty 1: Yes, I think so, yeah.

Interviewer: OK, that's good news. I know that throwing a bunch of numbers together into tables tends to be confusing. So I'm not surprised to hear that when you look at it, your first impression is, 'what am I looking at?'

Faculty 1: Yes

Interviewer: And that's one of the things I want to kind of address when we talk about learning analytics. Like who and how is this data going to be interpreted, right?

Faculty 1: Yes

Interviewer: OK, that's good to know. Now, if you were to be able to request how the data was represented for your course, for example if you found something useful, and you wanted to see it in a different format. Like, did anything jump out at you like, 'I'd really like to see this data but in a different form, or I'd like to see different data altogether?'

Faculty 1: Um, no, not in particular, I don't think....the, uh, no. No, not really, I think with the written explanation that would come with it in a thesis format I think obviously the tables would be more meaningful, but I think the tables themselves are fine, the way the data is presented.

Interviewer: OK, that's good to know. Do you feel like the data in the LMS is a complete set of what the students are actually doing for their course?

Faculty 1: Uh, can you clarify that question?

Interviewer: I mean, when we look at activity in an LMS, are we seeing everything the students do in order to be successful in their course.

Faculty 1: Oh, ok, um, (pause) yeah I think so yes. It's uh, if I think back to say my course, that course in particular, or my other course, and how my students operate and interact, and the level of activity that is expected of them, um, and that's built into the course as a possibility, yes I think that would reflect their sort of success level in the course.

Interviewer: Oh, that's fantastic. Now I know the data was anonymized,

Faculty 1: Yes

Interviewer: so we couldn't...and I don't see the final course marks or anything like that, but were you able to recognize...like, oh, I remember maybe this was so-and-so, or I can tell that this was so-and-so based on their level of activity, was it that granular for you?

Faculty 1: No, not at all, the anonymity stayed completely. If I went back, to, say, <course code> in winter 2016, I think it was, yeah, if I went back to that, course and sort of skimmed through the students' grades throughout and final grade, and participation levels especially, then some bells might ring. But, not having done that, you know I teach every semester I teach 2 courses every semester, well, two half courses usually, with someone else, and you know one semester rolls over on another, and there's no way that I, without going back and reviewing, there no way that I can keep track of what a particular students' performance was like in a course or any of the details. If I do, and I occasionally do have to do that, if a student asks me for a reference for example, I will go back a semester or two, whenever they did the course, look at

how they did, their participation, and so on, so forth, and any comments that I've made throughout, and then I recall the student, the individual student, I'd say, 'oh yes I remember her, she's the one who did such a thing and so on.' You know? She wrote a really good paper on such a thing. But I have to go back and review in order to do that.

Interviewer: Of course, there are so many students passing through for sure. That's great and I did notice in the preliminary questionnaire that I sent, I was quite happy to see, that faculty in general do go into the Moodle data and they do look at it in a reflective way, and you were one of those who said that as well, that you do regularly look at the data for things that are collected in Moodle like activities, total contribution and things like that.

Faculty 1: Yes.

Interviewer: Good. Do you find it's more of a reflective thing, or do you check Moodle regularly throughout the course as well?

Faculty 1: Uh, I do both. I, uh, I check course participation, I check each participant weekly throughout the course, like in addition to whatever interactions we're having, about every second week there is a formal discussion forum, and they are supposed to contribute to any three of the five forums, or four in one case, but a lot of them choose to contribute in the other forums as well, and so I, in addition to whatever interaction I have with people throughout the forums, or by email if they have questions and so on, once a week, I check every student, every participant, I take a quick scan or a check one day a week and I look at when's the last time they logged in, how involved they've been, stuff like that, and if I notice, say six or seven days have gone by and there's been no presence, then I'll send them an email and say, 'I noticed you haven't been in the

course recently, are you OK, is there anything... do you need any help with anything', something like that.

Interviewer: Oh, fantastic, and do you find that really helps to kind of...

Faculty 1: Yes it does

Interviewer: Get the students back in to either interacting or just communicating with you what's going on with them?

Faculty 1: Yes, yeah, it, uh, you know with some, with a very few students, it doesn't work because circumstances overtake them and they end up maybe not able to complete the course or something like that, but for the majority of students, just a little personal note from, uh, me as an instructor, will sort of, they will at least respond to me and say, 'sorry I've been travelling for work, it's really busy, and so on, but I'll catch up next week', you know? So then I check the next week, and they're caught up and everything's OK.

Interviewer: Excellent. So for, say, someone like me or someone going in to your course, either after the fact, or even during the course, I could see, that a student has, you know, maybe a bit of a hiccup in their activity. But what I wouldn't know from the Moodle information is that you did reach out to the student and that the student did communicate with you their status, and that things are moving forward. So that's something that we wouldn't capture, being external from the course. Is that right?

Faculty 1: That's true, yes

Interviewer: Yeah. So, do you have any concerns with, say, administrators, or someone beyond the faculty role, really, anyone beyond the context of the course trying to make sense of the LMS data.

Faculty 1: No, I don't think so, not at all. No.

Interviewer: So you feel like if they were to go in there, they'd get an accurate picture of what's going on, and they wouldn't be missing any information?

Faculty 1: Well, they'd be missing any personal, I...we operate...well ,<name> as well, my teaching partner right now, we operate in pretty much the same way, and we have all the stuff in Moodle that gets reflected, any interactions in the course like that, the students level of activity, our level of activity, that's all reflected there in the course, in the LMS, but then, in addition to that there is a lot, a fair amount of private emails, and that doesn't get reflected. And there is a fair amount of that, I'd say every week I get...when I'm the lead instructor, I probably get 6-8 messages every five days or so from students, and I would respond individually to each student, and now and then if they raise an issue that I think that the rest of the course, the rest of the student can benefit from, I will respond to them and then I'll say 'I'm going to post this to the news forum, because I think other students can benefit from this as well, and then I'll post to the news forum. So, um, I try not to interact heavily in the social forum in the course, and the reason I do that is because I feel that that's a place where the students can interact well with one another, and they don't necessarily, it's not designed to be about heavily about course content and things like that, and so someone might post to another student, or to everybody, 'I found a great article on such a thing', and I do scan it regularly, and occasionally I'll just put in something like 'thanks for posting the link', for everybody, or if somebody is in a discussion with somebody else, back and forth, and they seem to be going astray, in some way, in their thinking on an issue, then I might interrupt and post and say 'I was just reading your post on such an issue, uh, I think you really should consider looking at it from another angle, because that's the traditional way of looking at such a topic, and so on. So I'll sort of set them straight a bit, but other than examples like that, I try not to interact heavily in the social forum, because I consider

that for them as a sort of a learner to learner interaction, for the most part. And news forum they can't post to, but I post updates and information, and we do, in my course, we do a weekly moving on message, which reflects last unit's, last week's work and where we're heading this week, and sort of in an encouraging tone.

Interviewer: Right. There's a lot of guidance there that tend to make the students not only know what's expected of them, but also feel comfortable that they're on pace.

Faculty 1: Yes, that's right.

Interviewer: Yes, so that social forum, I completely understand the design elements to kind of back away and let the students have their space, but also still provide the guidance where you see...you know make sure they're not going off the rails, so they don't lead each other astray, I guess.

Faculty 1: Yes.

Interviewer: So that's great. Uh, one question, because I want to kind of link this back to the whole community of inquiry framework, based on the course data, there's a lot going on that can be aligned with the elements of the community of inquiry. So I guess my question is, was this course originally designed to heavily align with the community of inquiry framework or did it sort of evolve over time?

Faculty 1: Uh, it has changed...I've worked on the course, I'm sure about 15 years now, I think, and originally it was redesigned by a friend and colleague of mine, who I used to work with, he was a full time faculty at AU for a while, <name>? And <course code> existed long before I guess he and I ended up being involved in it, and at some point early on, we thought it needed a...quite a revamp, and he as full time faculty redesigned the course. And I have made some adjustments since, but they haven't been really heavily, they haven't really changed the course

dramatically or anything, they are, uh, they are more fine-tuning, adding more recent information and things like that. And I would say with <name>, I knew him pretty well, and worked with him, and I know he was well aware of the community of inquiry method and approach, and, um, he probably, I can't say that he designed the course as, uh, a reflection of that, but I think he certainly had it in mind heavily throughout. Like I would be if I redesigned courses, I'm influenced by that model, and by other things as well, so I think, yes I could say that was the underlying thinking, maybe, in the design of the course.

Interviewer: Good. And any sort of tweaks since then, you mentioned, you wanted to include newer, more updated information, were there also any tweaks that were necessary based on the way students were interacting, or the way students were working toward their goals, maybe just to guide them in a better way?

Faculty 1: Uh, I...no, I think, <name> originally built in a, which was a good idea, we thought, both of us thought, he originally built in a debate in the course, and after a couple of runs of the debate, I realized we could have a much more relevant topic for the debate, and we could formalize it, and really make it worth an extra five points on the final score, and formalize the structure so now the debate is, the debate issue is really a... it reflects as much as we possibly can, a formal, uh, face-to-face debate, and it, uh, the topic is more relevant, and based on a controversial area of learning theory as well, so it's more amenable to debating, because there is of controversial readings about the topic and so on, but that didn't really change to any extent the focus, it just fine-tuned it, I think.

Interviewer: Right. And do you find the students' feedback on that particular activity is quite positive?

Faculty 1: Uh, really high, after they finish. Not during but after not while they're trying to do it. (Laughter) Well, what we've done, is that the debate has three sub-teams, there's the pro side and the con side. Depending on the number of students in the course, there'll be a pro and con, initial argument, two teams, initial argument, and the two teams, pro and con, first rebuttal, and then two more teams, pro and con second rebuttal, and nobody is allowed to post other than those teams, so it's not an open debate, it's very formal, it's very structured, and each of those teams gets approximately 4 to 5 days, we form the teams, we don't let them self-select because there are lots of other activities in the course where they can self-select, so we assign the students, and they have at the most five days to get about a thousand-word argument together, and that is very academic and very structured, and so on, and post it. And so there's...it's high pressure while it's going on, and especially for students who are part-time and who have work lives and family lives and so on, and they have to be really free and able to concentrate, for their particular four or five day period on that activity. But when it's over, they all are, we've asked each year for feedback, especially since we changed the debate, which would have been about 2 or 3 years ago now I guess, 2 years ago, and it's always very positive, they consider it really a great learning opportunity.

Interviewer: I would be curious, um, I'm not sure if you've been able to get a reflection from the students when they do this, but I'd be quite curious to see the different dynamics that go on in these groups, so number one they're not self-selected, number two, they would need to interact quite a lot during those few days. And that's actually, I know they have an option of using a space in Moodle, but it looks to me like that's under used, and...

Faculty 1: Very, very underused now.



Interviewer: Yeah, they're choosing other methods of interacting. When you're looking at the course dynamics, you know that there's a lot going on there, and you're kind of blind to it, and you'd like to see how different groups work together.

Faculty 1: Yes. And that's one of the things I'm finding that has changed radically in say the last 3 or 4 years, maybe, is, one time, we had every single, in the courses that I taught, every single thing that involved group work had its own team spaces set up for private group work by the teams, and we still do it, and we get <name> to set all of the teams up, and provide the names and everything, but there's one team in five, now, or less, one team in ten, maybe, that uses the private group space in Moodle anymore, because there are so many other alternative ways of people sharing and working together now, technologically, that they don't use the Moodle space at all. Therefore, we don't have the same kind of ability to see their work as it develops, as we used to at one time.

Interviewer: That's right. So I would ask if we were trying to really use learning analytics to study the community of inquiry model within courses, do you feel that would put you at a disadvantage from seeing everything that's going on, now that it's really across platforms, and technologies and different users preferences, and all kinds of things like that?

Faculty 1: I would say so, it's not a serious problem, but it's certainly a disadvantage compared to what it used to be, yes.

Interviewer: Yes. I mean, choices are probably a great thing for the students, because they're probably more comfortable with all of it.

Faculty 1: Yes, wonderful.

Interviewer: But in terms of trying to see how the learning processes are going on, and in terms of the activities of learning analytics, it's quite complex.

Faculty 1: That's right. Yes it is.

Interviewer: OK, well time is flying here, so I just want to get your ideas on a couple more things before I let you go.

Faculty 1: OK

Interviewer: Um, do you feel like using the data within Moodle is a useful way of onboarding new or novice teachers who are coming in to teach within the realm of the program.

Faculty 1: I'm sorry, you're going to have to repeat that.

Interviewer: Oh, um, am I clear?

Faculty 1: Well, not quite I don't think, could you just repeat it again?

Interviewer: Sure, I'd like to know if the data in Moodle could be used to share with novice faculty. For example, if they want to be teaching in a similar course as yours and they want to see how things unfold inside a course before they start on their own. Do you think it would be a good resource for them to learn how the course design actually works with the students?

Faculty 1: Oh, definitely, definitely. I couldn't emphasize that more. I started, I always taught on my own, for all of my academic life, and about 15 years ago at <another university>, two of us were quite busy, we knew one another as colleagues, and we were quite busy so we proposed to <the university> that we co-teach one of the courses there, a course there, so they jumped on the bandwagon and said sure, you know, we explained we would expect only half pay from them, obviously (laughter), and so they jumped on the bandwagon, and then at one point they developed a new course and three of us, another woman I also taught with, decided that she would like to teach with us as well, and so we proposed the three of do it, and that worked out really well. And I actually ended up teaching with her, <course code>, in fact, for a good few years at <this university>, and I think with all that, one of the people that I started teaching with

at first, at <other university> had little or no instructional design background, little or no teaching experience, actually, but a lot of good, solid content area, and so she really appreciated, sort of, my explaining the elements of the course and reviewing it with her before we started working together that fall, and I think that is true, I'm now teaching with my friend <name>, who I worked with on his dissertation, 2 or 3 years ago, informally, not formally on his committee, and he had done training development for his industry, but he had never really taught anything, and when he took a look at my course and the design and everything, then he started comparing it to his experience doing his master's degree and then his doctorate, the courses there, and he said this design is just great, and he could see the logic of it being community of inquiry based, and the strength of the three elements, Terry Anderson's three elements of student-student, student-teacher, student-content elements all being integrated, and he thought, especially for <course code> since it's a course on learning theory, reflected and gave a good grounding to the idea of learning theory because it was reflective of learning theory. So yes I think definitely anybody with not a lot of past experience in developing and designing online courses, or taking them on to teach them, I think that yes, they would benefit greatly from having access to existing online courses. So that they could look at how they're structured, what the key elements are, how they integrate activities and interactions and so on I think that would be a really good thing.

Interviewer: Yes, that's a big one for sure. I feel like the data needs to be fairly complete. A lot of course designs don't have the majority of their activities through the LMS, so you'd need to pick and choose very carefully what you share so you don't get the wrong idea, but yeah, if you have a complete course I think that would be golden, so I love that you expressed that, that's great. Do you feel that most Faculty have the technology tools or the time to learn the technology to really get the most out of the data that's collected in their LMS?

Faculty 1: Uh, I have no idea. I only know of the people I'm teaching with. I've been for the past...since I moved out west, for the past 20 years, I've been teaching as a contract faculty member at different universities, mostly <this university>, over time, but also, <lists 4 other universities>, and you know at different times, different courses, but usually same content type courses that sort of reflect my own interests and expertise and so on, but other than that I have very little interaction with other Faculty, and with full time faculty.

Interviewer: Right, being all online, yes.

Faculty 1: Yeah. So I really couldn't say, I know, for me, I have had to keep myself updated as much as possible, so that I can really, could change over the past 20 years, could adjust and adapt as the LMS sort of dynamics changed and other additional technologies could be added into that and so on. It's a challenge, I know that. Because, I know, for example, right now I'm behind on some of the really, uh, social engagement elements and stuff that like that that could be going on.

Interviewer: Yes, and it's all a time and energy commitment, so it's kind of like a prioritization of what's going on, what are your needs, how are your courses going... So if you saw a major need for that, obviously it would fly up your priority list, but that's not necessarily true for everyone at the same point in time.

Faculty 1: No, that's right.

Interviewer: Right. So yeah, I love that. OK, one more question, I know we're right at the time limit here. I know we talked about it, but how was the use of learning analytics, such as the data you can collect in Moodle, how does that impact the time you spend on the other tasks related to teaching this particular course? Does it take away from the time that you spend on other things, or is it kind of over and above all of the other things that you're doing, there's a lot. I can see it all in Moodle, there's a lot that you're doing in the course.

Faculty 1: No, I don't consider it in any way an added burden or something that takes away from other things because my time is flexible. <Personal anecdote and laughter shared> About five years ago, I'd say, I decided it's time I started to edge towards semi-retirement. So I cut back a lot of my work that I was doing, like I was teaching at one time, in the same semester for three different universities. Now it might only be one course at each one, but it was nevertheless pretty busy. Plus there was occasional other contract work that I was doing. And I did some, not as much as I would have liked, but as a contractual faculty member you don't have the same opportunities, but I did some thesis supervision, which I always loved, and things like that, so there was a lot of work up until 4 or 5 years ago, and I probably used to work something like 5 hours a day 5 days a week and a couple of hours each day on weekends, and then I decided, ok it's time to really recognize the fact that I need to really slow down, and I was also involved in some other volunteer activities that were taking more of my time, so I cut out teaching...first I cut back from a couple of universities, and then I had <other university name> and <this university name> left, and I think it was about 3 or 4 years ago I cut out <university name> and kept <this university>. So now it's only <this university>, it's only the two courses most semesters, and I team teach both courses, now for a long time I team taught <course code>, for most of my working life there, but <another course code> was my own course that I in fact wrote and developed. But now I also team teach that with my colleague <name> because he has a fair amount of knowledge in that area as well from his Master's degree. So really now, I probably end up working most days, except when assignments roll in, or the end of the semester or something, I probably end up working an hour, and hour and a half each day, and if there's some course revamping to do, I might add another hour each day, so at the most I'm 2 – 2.5 hours each day, and so I don't feel any pressure in having to divide my time between tasks that

are involved in teaching, so I have lots of time to take advantage of what I can see in Moodle, and how I can keep track of everything in Moodle, in addition to just keeping the course going and so on.

Interviewer: So I guess a realistic idea of what time commitment is required for teaching these courses is key. If you take on too much as a faculty member, yeah you are going to find yourself unable to catch everything.

Faculty 1: Yeah, like if I had a full time job as a faculty member, like when I did, and the theses supervision, I always did a ton of that, and everything else, this would be way, way, way more onerous than, say, teaching a live course. And I have said that from the beginning, that this kind of teaching compared to live courses, is probably generally pretty near double the workload.

Interviewer: Uh-huh, I was thinking the same, so...that's very true.

Faculty 1: Yeah, it really is, so I discovered that...if you do it in what I consider to be conscientiously. Like I will not take weekends off because I know students, working students, weekends are when they're trying to cram in course work, and if they get stuck and have a question, I don't want them to wait until Monday, from Saturday morning or something for me to answer them.

Interviewer: That would be the backwards logic of why they signed up for an online course.

Faculty 1: Yes. So the demands are, and the amount of individual interaction, like when I taught live, I went into a class, and I lectured for a while, and I'd say 'any questions' and hands would go up here and there, and we'd discuss within the class, and everyone would hear the answer, and that would be it. Well now, it's not that, it's individual. So everything is multiplied in terms of time requirements.

Interviewer: Yeah, that's for sure. Since you're talking about time requirements and when the assignments roll in, um, I did want to tack on this kind of question for you. In this course, do you have an ideal enrollment number?

Faculty 1: Yes. And the ideal enrollment number, even with two of us teaching, co-teaching, the idea enrollment number would be 20 or under.

Interviewer: Right. So what happens when you get more or less than that ideal number? Do you have to, or do you tweak the course design at all to make it more...manageable?

Faculty 1: no, we just suffer. There was a time, I won't name names, but there was a time, uh, when I was teaching at <this university>, where, I don't know if they ever had a firm notion about enrollment numbers for grad courses, but there was one person who, they came up with the idea that if you had more than 25, they'd pay you a bit extra per student. But that wasn't any great benefit because it wasn't the money that was important, it was the time. And then there was someone else who came up with the idea that, after 25, this was years ago, after 25 we'll make a second section of the course, then under another director, that got swept aside and we'd often end up, especially with 603, a required course, we'd often end up with 28 or 29 and it was killing us.

Interviewer: Wow

Faculty 1: And especially if you were, which I wasn't, thankfully, teaching it alone, but even teaching with someone else it was heavy. Then, the past few years, the consensus seems to be that at the most there's 25 and after that there's an automatic second section. Then there's only 12 or 13 in each one. And that's much more amenable. So I'd say overall if you look at the amount of discussion in the discussion forums, and our wanting to be involved in those forums, to, you know, keep track of the students learning plus to show our presence and so on, and if you

look at that and if you look at all of the assignments, and the length of the assignments and complexity of them, over 20 is grueling.

Interviewer: Yes, I would imagine. And maybe the LMS data could be kind of shown to, maybe in larger groups, students kind of get lost in the mix. Or what do you say when you're answering 28 answers to the same discussion topics, you're student 29, what do you add?

Faculty 1: That's right.

Interviewer: So there must be that as well, that could support what you're saying, obviously there's a huge workload, hopefully it's obvious, but beyond that, if they want more reasons to keep the ideal numbers, it might be there as well.

Faculty 1: Yeah that's true.

Interviewer: OK, um, well, I have a lot of data to reflect on, and your perspective is amazing and valuable and I look forward putting this together and to sharing this thesis with you.

Faculty 1: That would be great, I'd love to see the results.

Interviewer: Fantastic. Anything else that you would like to add at this point?

Faculty 1: Oh no, I think I've talked long and hard enough.

Interviewer: So now it's time to move on with the rest of your early semester activities I guess.

Faculty 1: Yes, now I have to go to work on this term's course. (Laughter)

Interviewer: OK well thank you so much for sharing your time and perspective.

Faculty 1: You're welcome. And good luck with the thesis.

Interviewer: OK thank you so much. Take care, Faculty 1.

Faculty 1: Bye

End: 1:10pm



**Appendix O: Faculty 2 Interview Transcript**

Transcript – Telephone interview with <Faculty 2>

December 30, 2016

Start: 2:00pm

Interviewer: So I sent you a pile of crazy numbers and sheets and I guess my first goal of this whole interview is going to be your first impression, or what kind of sense you can make of this data that is just kind of, I guess, thrown at you coming out of your course.

Faculty 2: So what I did because I teach, you know, many courses so I went back to the two courses just to familiarize myself because I do remember the students, so...and looked to see the spring session was a much smaller group than the fall session. But also I think the most important thing you may want to discuss with me, um, because I'm really sold on Community of Inquiry, first of all, I'm quite familiar with that, yeah, I would say, <name> is like my mentor, so I'm just following in her footsteps all the time, and Terry Anderson, so.. the one thing I wanted to mention to you, is that I use much more than Moodle. I'm a firm believer in Emotional Intelligence when you're teaching. Do you want me just to rant like this for a little bit to explain?

Interviewer: Well, yeah, I was going to be formal and make sure I've covered all my bases here, I just wanted to let you know that I will be recording this conversation, so I want to do an in-depth analysis, um, of course you are under no obligation to complete the interview, so you can stop it whenever you like, and let me know if you have any questions or concerns or any clarifications about what's going to happen with the data, or what's said and all of that, and that all of your answers are completely confidential, so it's just for the sole purpose of this project.

Faculty 2: I've been an expat for more than 20 years and so I have to shake my head when I come back because most of my research is done in underdeveloped countries and you know all of the protocol here in the West for security, security, ethics, ethics, um, it's over my head, it's

not...It's something that I really have to fight in the developing countries because if you ask them to sign a piece of paper then they won't even talk to you.

Interviewer: Oh wow, yes, I can see that.

Faculty 2: So I have no qualms, go ahead, use anything, there won't be lawyers involved.

Interviewer: OK, excellent. So what I want to do is just, like you kind of put it, have you share your thoughts, whatever comes to mind, what are your first impressions, things like that, and I may lead you into certain questions that I want to hear your opinion on, if necessary. OK? So, I like what you said because when I looked at your data, that was one of the first things I could tell as well, was that there was much more going on than what you can see in Moodle. So if I could hear more about that, it would be fantastic.

Faculty 2: OK, so I begin any of the courses that I teach, during the introductory week, I connect with every one of the students through Skype. And it's surprising, actually, because only about half of them even use it. So sometimes I have to actually have to help them set up Skype or download it or whatever. Once they are on it, then we connect and we have a conversation, we chat. That is enormously powerful. If you were to just...I have to tell you, too, my background is I'm a teacher, not just a content expert. So, I was a teacher for years and it's the teacher that comes out in me with this kind of thing. To me, Moodle is, um, can be very, very exciting, but only if there is some kind of emotional connection, or social connection, with the students first. So we have about a 15-20 minute phone call, sometimes it turns into a one-hour phone call, uh, one of the things I do with them initially, and I also tell them that this is the fastest way to connect with me so we do a lot of texting on Skype, rather than emails, or messages on Moodle. Moodle, I find the only drawback, at least with our setup at Athabasca is that sometimes people will message me and I'll get it 2 days later.

Interviewer: That's right. Yup.

Faculty 2: Do you have the option to look at the feedback for the courses too?

Interviewer: I do not, no.

Faculty 2: Oh, OK, so the feedback is always exceptional with my courses, I am proud to say with my courses, and most of the time they mention that, uh, I connect with them like 30 seconds after they ask a question, but that's because I just leave Skype open and they text it. So it's much, much faster than going in and checking emails etc. And, um, often they'll phone again, after they text, I'll say just give me a call and we'll chat about this. So there's a lot of audio going on outside of Moodle.

Interviewer: Wow

Faculty 2: The other thing that I have learned, um, I started teaching with <University Name> about four years ago, and I found that once in a while, there are often special needs students, or people that have situations that aren't necessarily special needs. And, uh, sometimes they'll tell me in week 10, um, this was at the beginning, 4 years ago, and I'd go, uh, why did you tell me now, if we have known in week 1...so one thing I specifically ask, is there any special needs issue that they feel they want to share with me, and I make it very warm and fuzzy, and they always do, um, because they don't have an obligation to share that with me, but, um, and we can talk about that in both courses, so for instance, in the spring course, you have the names of the students, right?

Interviewer: I sure do, yes.

Faculty 2: And I can share this with you right? You're just using their numbers.

Interviewer: Yup that's right.

Faculty 2: So for instance, in the spring, when I chatted with <name>, she had actually emailed me a year before, or registered for the course, and then she dropped out because she had cancer.

Interviewer: Uh-huh.

Faculty 2: So that's huge. So then I see her signed up again so when we Skyped, we had quite a lengthy conversation, she was still dealing with the chemo, etc. Well that's certainly going to affect Moodle, and participation, so what I said to her was, when she was having a bad week, don't worry about writing and reading; Skype me and we can discuss what you got from the readings.

Interviewer: Excellent.

Faculty 2: So I assess in very holistic ways. Another example would be in the fall, <name>, I can't pronounce his last name, um, <firstname>, and he's ADHD, and severe, and so he was quite challenged always in all of his courses with reading and writing. So I said to him, well, we can do something else rather than you participate in the forums. So what he did was he create for me, um, thoughts like a journal, he created a journal, and even put some audio in it, some little videos. I said, it doesn't have to be reading and writing, you can talk to me, um, you don't have to put pencil to paper, so there's a lot of things like that going on. I tried to keep the two interns informed a little bit, but it becomes too much to have them, because you can't blind CC them on a Skype call, but I did make them aware that there were a great deal going on besides the Moodle. Um, what else can I tell you about that kind of thing... I certainly mentor those that I think are capable <inaudible> students um, one in the spring and one in the fall have now applied for the Athabasca University doctoral course...uh, program.

Interviewer: Oh, great

Faculty 2: And I do try to create, I know it's very new to them in the beginning, a lot of them are used to very, very structured, I say overly structured courses, and that not what a community of inquiry is.

Interviewer: I can see that, for sure.

Faculty 2: I, I really, I...oh, the other thing I do, so the first week's forum, I look at the ones who have jumped in immediately, and really know the forum procedure and game, so to speak.

Sometimes I ask them to shorten their posts, because you can get some of the gung-ho people, and it just becomes a headache to start reading these thousand-word posts with 5 references, I'm sorry, like for each forum, I know that the other students are intimidated and they won't, so what I do, is with the 2 or 3 that jump in first, then I Skype them, and say thank you for being such leaders, will you make sure when others respond to you, or do make a post, that you will jump in and respond to them so that they feel good.

So, um, I actually, you know, I use the word for leadership and for teaching, I use the word manipulation a lot. And I think that if, um, if you look it up in the dictionary, it's not a negative word. We use it on the street negatively, you know like the manipulative wife or husband or something, but, that's what, in order to create a community of inquiry you have to be selling and manipulating the scenario, and the personalities in order to make it work, but..

Interviewer: So would you equate manipulation with leading a community of inquiry?

Faculty 2: Absolutely. What manipulation simply means to have people see things the way you see them. And that's a very positive thing. So, basically in the first and second week, quite a few of them are saying, oh we're not used to being this free, to discuss whatever we want...by the end of it, and in their comments and feedback they're going, wow, wow <Faculty 2 name> just lead us into this community where we did everything, so they're very pleased with it in the end.

Interviewer: Yes, and I can see that from what I see in Moodle as well.

Faculty 2: Yeah, so that's about all I have to say about so you could probably guide me other ways with questions, but...

Interviewer: Oh, great. So I love what you say about the whole picture about what goes on between you and the students, uh, and their individual needs, and a lot of that you don't see in Moodle, um, so what I showed you, um, you know, total activity, the elements of the community of inquiry, uh, broken down per user, and all of that, did any of that data give you any information you didn't already know?

Faculty 2: No, not really, like I'm really interested in reading your thesis, actually, but as I looked, um, the only thing that I did see was it seemed to be far more activity in the fall, and that would make sense because there were far more participants.

Interviewer: There were, yes.

Faculty 2: And, um, it's a challenge, I actually like a class of 20, it's a real challenge with 8 or 9. And when a couple drop out for personal reasons, one was in an accident, and, so it became smaller and smaller that spring session, and, um, it's hard to build the dynamics with a small group. Because I would say, in any given forum, particularly the way this one's laid out, and I have changed quite a bit of it, by the way, for the next session, I got permission to change it, and I'll give you those changes, but to me the participation, because I said to believe in the Community of Inquiry, the participation grade was very insignificant, 10%, and that last project is 60, which is massive, so what I've done is change the participation grade to 20% and that last project to 50%, which I think is a better balance, and I've described what participation means, and it's much more than just the forums, and Moodle, it's connecting with me, and communicating weekly with me, which makes it a little bit more equivalent to, well you don't

want it equivalent to face-to-face, but it makes it a little bit more dynamic, in that , um, I am their guilty conscience, you know, like I often send them a text, I'm worried about you, I haven't seen you for 6 days, you know, on Moodle, are you having any difficulties, and often it's just a thank you, thank you for the kick, and sorry, sorry, and they're apologizing, that's good, they're feeling guilty, ha ha, manipulation.

Interviewer: And that's what you do in a face-to-face environment as well, it's hard when you're face-to-face to not have that same feeling, so you're re-creating that which is fantastic.

Good. So when I look at the spring and the fall, since you brought up, sort of the comparison between the two, I see the fall as very, very busy, um, and you as well, I mean your activity is also logged, and your activity is enormous, and what you just mentioned is that your activity in Moodle is only the tip of the iceberg. So do you find in a larger course, is it easier or harder to establish those one-on-one connections that make the student feel able to express themselves and reach out to you.

Faculty 2: This could be almost internal, too, because it's actually not what you would think, I find it easier with the larger group. You would think with the smaller group, I'd have more time with each student, you know, the ratio. But, I think, and I was questioning, thinking of this as I looked at some of your stats, and thinking, no, I think I'm more motivated also with a larger group. Maybe I'm not consciously aware of that until you contacted me and sent me everything, (laugh) I thought you know I get energized with more students, also.

The spring group, it was a sad little group, actually, because two of them had to drop out for external reasons, not anything to do with the course, um, one of them was travelling a lot and was up in remote areas, <firstname> was going through the chemo, it, you know maybe if you could observe seven classes, then the spring class might almost be an anomaly.

Interviewer: I was thinking that, yes.

Faculty 2: Yes, I think the Fall stats represent more of a typical semester.

Interviewer: OK, excellent. So, based on your course design, and your subscription to the community of inquiry model, if you will, would you have a minimum, and/or a maximum class size that you would have designed your course for, to work best with?

Faculty 2: I think 20.

Interviewer: 20 would be your ideal number?

Faculty 2: Yes

Interviewer: Excellent. Now, do you have any modification that you could make on the fly for a smaller or larger group if necessary?

Faculty 2: The only significant difference may be is that final project, it's very, very personalized, and I explain to them, they have about 20...no maybe 10 options there, but almost all of them don't even choose one of those options, we begin discussing it in week 3 or 4 on Skype, and what I want them to do, I call it with them, double dipping, I want them to create something that they will use either in their workplace right now, or something they want to use in their portfolio to move in whatever direction they want to professionally. So most of them...there have been some magnificent projects actually, if you look in the course you'll see that one little gamification that I put in, which is from a previous student, where it explained... she wanted to do that because she wanted to get a job, which she did get, by showing what she had created, so they really feel good about that second project because it's very much problem based, or project based, um, and very much relevant to their personal situation.

Interviewer: Wow



Faculty 2: So a lot have created, just, a lot of the stuff is, um, um, confidential, for instance, one of them, I think... <name> was in the armed forces, and he created... and I say to them, it depends what you want to do, if you're an IT specialist, you do it all, if you're a teacher, then, I don't care if you have an IT team to help you, what I want to see is your synthesis of the content with this project. So he created this magnificent video series for officers in the armed forces, selling them on inclusive education.

Interviewer: And that's not something that you can share.

Faculty 2: That's right, and I can't um, you know I can't show that to anybody, but wow, it was so clear that he had just incorporated everything from the content into these videos.

Interviewer: Wow. So as I hear you, I almost, I'm feeling like there's this interesting dichotomy, between the community of inquiry, knowledge building, and all of that sharing going on, and then the final project that's really completely separate from that, they use what they learned but they don't share it. And that's really a personal thing.

Faculty 2: I know, and, if, I really wish we could share them, but in many cases they're doing something for their corporation, or their institution, and it's private. Because I've often thought, wouldn't it be great, because it kind of peters out that last week, wouldn't it be great in week 13 to be sharing them, but we can't, so there's no point in sharing one or two, because then others would get frustrated that they couldn't share.

Interviewer: Right. But in the end, they've all created something that's deeply personal. And the motivation for that must be huge.

Faculty 2: Yeah, and valuable. Really valuable.

Interviewer: Amazing. Oh...it's so exciting! I want to take your course. (Laughter). Alright – to get back down to some of the things I want to hit before we take too much of your time, I want to

go back to all this basic Moodle data that we're looking at. When you read a lot of the literature about learning analytics, who's supposed to use it and all of that, you get a lot of this sort of... a lot of generalizations. Grouping data, grouping courses, grouping programs. Do you have any concerns? About having the data from your course being used and interpreted by someone other than yourself? Like, outside of your... I guess, teaching role?

Faculty 2: No, I don't at all. Which is one of the reasons I even have... <Name> has always given me two interns every fall. Even when I taught face-to-face for years, I had an open door policy. If I had my way, schools would have a two-way mirror and the community could walk in at any time and look. But most teachers wouldn't accept that. So I'm very, very open door policy. Um, because to me, if I am doing something wrong, I want to hear about it.

Interviewer: I love that.

Faculty 2: It's professional development. This is a new field, <Interviewer name>. I mean, it's still so new. Online teaching, not distance ed. But, um, yeah, any feedback is great. The two interns this time around, I experimented, and usually I have the interns come in at the beginning, and I said, I am experimenting, um, I had them come in at the end. Um, and we skyped, the three of us together, and decided that, no, at the beginning is too soon and at the end it's too late so put them somewhere in the middle next semester. But I think they felt that it was all valuable, too because they were peers and we were experimenting. And the whole thing's an experiment right now. As far as I'm concerned.

Interviewer: It sure is. I like that as well that you say the whole thing is an experiment. Because, you know, looking at the data, you wouldn't want to jump to any conclusions because you just saw this data. If you were external to the situation, so you weren't in the course, you weren't

involved, you really couldn't conclude anything. You know, you see a piece of the pie, I suppose.

Faculty 2: Yes and hence the argument for mixed methods, you know. You need both. But you already know that.

Interviewer: Yes you do. So I love that. What about institutional use of data pulled from LMS systems? Would you find any practical use for that in your scenario?

Faculty 2: If the institution was pulling it, I would like to think that they would also look at the feedback from students. Because if they're not going to interview, if they're just going to look at the analytics, then they better look and see the attitude and the comments from the students, I would say. If they were just looking at the data again... which I don't think they do. Because I've already had comments from different people in <department> about the success of my courses, so they're obviously looking. They're probably just, you know, I'm sorry, the dollar is the bottom line sometimes, they're probably just looking at the student comments and not at the analytics (laughter).

Interviewer: Well, that might be, right? Um, so something, say, you know like the...I'm not sure if you're aware...of the Purdue University course signals system? Where they look at LMS activity and they created a student-facing dashboard. So the student has a green light, red light or orange light, depending on their level of interaction in a course? So something like that...if you would...

Faculty 2: I like that.

Interviewer: You like that? OK, good. I was wondering if that might...um...based on what you said about students having their own individual situations and maybe doing a little bit less, if they all of the sudden got an orange light or a red light, even though they're doing what they

need to do. Do you think that would be an issue, or do you think overall it would be a good thing to have that sort of feedback for the students.

Faculty 2: I think that would be great. Because what I do is...go in and see when they were last on Moodle, and as the course progresses, the statistics, I mean it's massive. <Inaudible> responding and to be trying to look at who posted what, and what forums just becomes, um, unbelievable I think....impractical for the teacher. So it would be a great way to use the analytics, so that rather than me having to go in and check, the amber light would tell me to go in and check.

Interviewer: Excellent. So that was something I got from your initial survey as well. And it surprised me that you do that, that you actually already log in and see who's been active. I guess it surprised me because it's a lot of time and you already have a lot going on.

Faculty 2: Yes. And I guess that's the teacher in me. And I think that's one thing that will begin to change. Here's my prediction in the next ten years. And everybody's afraid to predict. I would say that with online teaching or online courses, the instructor...it's more important that the instructor is a teacher or at least have some pedagogical background. I think the days of the sole content expert, not just a lecturer, but the content expert face-to-face, you know, they never, none of them are teachers, they're lecturers. And with online, my prediction is you're going to see fewer and fewer tenured professors and you're going to see more and more adjuncts that are content experts and teachers. That's my prediction.

Interviewer: I think that's a good prediction. Looking at the way things are going.

Faculty 2: In my feedback over and over and over again, students say it was so nice to have somebody that actually taught us rather than just dropping in every two weeks to see what's going on. So there are a lot of negative comments about other courses.

Interviewer: Well, yeah, in comparison, you know, that's what's going to happen. So, just a couple more questions for you. Do you feel like using the data that's available in Moodle, the way it was coded using the community of inquiry, that sort of thing. Which is really context-specific, obviously not all courses are design that there is an established community of inquiry. So, taking data from a course and representing it in terms of the course design and the theoretical framework behind that, do you think that's a good way to visualize all of the data that's available? To get a better picture than maybe just activity, counts, things like that.

Faculty 2: Yeah, do you know what I'd love to see, and I don't even know if it's possible. I'd love to see...like I'm looking right now at your excel, um, line charts. Then you did the excel charts with the numbers. The other ones were all numbers. I would love to see it visually. I was having difficulty...I would love to see a line chart, with each user, myself and the students, and see the activity, and somehow...now I'm not the expert, you are, somehow the interaction, I'd like to see graphically, the interaction between the students and I, lines crossing when they talk to each other, I don't know if it's even possible.

Interviewer: Oh, OK, like... uh, you can. Like, uh, social network mapping, that sort of thing. Where you can see who's talking to who, that sort of thing?

Faculty 2: Yeah. That would have been really interesting.

Interviewer: Oh, interesting. Yes, that's one way to do it, yeah. Would you want it to be done in a way that you could also see different elements of the community of inquiry?

Faculty 2: Yes. Exactly.

Interviewer: Excellent. Did you find it useful when you looked at the excel chart that had the different elements of the community of inquiry per user. Like counts of exploration versus integration, like cognitive presence, and so on.

Faculty 2: Yes. And you know, even with the numbers, I could identify 4 or 5 students in each group. <laughter>

Interviewer: I thought you probably could, yup.

Faculty 2: But it would be interesting just to see it...I mean, I'd love to see it with the names, of course, that's more...well, for me. But, uh <inaudible> uh, you know, because he didn't participate in the forums, you know, he did something else.

Interviewer: Uh-huh, right, and you could see that. I guess what I envision, or what I would dream of, as a teacher as well, and an advocate of learning analytics, is that you could actually support a teacher in their endeavours, in their course design goals, by providing them analytics that match what they want to see. Does that make sense?

Faculty 2: Yes. Yeah.

Interviewer: Because I don't think, you know, you can't expect online teachers to have the technological expertise and the time and the resources to be able to create this stuff on their own. But this data is powerful, it can tell you if you're on the right path, if you're losing students, all kinds of things. And I think it would also be excellent for teacher training. To onboard new online teachers, um, to show them what works and what really falls flat. So we don't all have to learn by our own trial and error and therefore fail a few groups of students before we get it right.

Faculty 2: Exactly.

Interviewer: Yeah. So that's kind of where I'm sitting. I love your perspective, it's fantastic.

Faculty 2: Something else that I do. I don't know if you were looking at their grades at all.

Interviewer: I do not have access to their grades, no.

Faculty 2: One thing I do with the first assignment only in every course. And it's usually always a paper, they can submit it to me first and I will correct it, give them their grade, and then they

can choose to make the corrections to improve their grade. And most of them take advantage of that. And again, that's pedagogy isn't it? How many times have you received a paper, you slide down to the end, you look at the grade, you put it away and get on with the next one. But, if I've made all of the APA comments and all of the additional research they could have done, and they go through the paper and actually do them, its deep learning.

Interviewer: That's right, yeah

Faculty 2: So that's another thing that they tend to appreciate. And might take away from the forum discussion again, because they're working on their first assignment longer than usual.

Interviewer: Yeah, and looking at the volumes of activity in those forums, you wouldn't expect that students are also spending hours and hours on these deeply personal projects or re-doing a paper to hone their skills. So it's amazing how much goes into these courses. It surprised me how much each students actually puts into it. I was a student in these courses, and I put a lot of effort in, but I honestly did not expect that a lot of the other students also did that much work <laughter>.

Faculty 2: Yes, yeah. And again, that's selling, to me that's motivation. Those first three weeks, you are motivating them, you are making them feel very, very special, and each one of them is. And you're making sure that they know you know them, and that just makes everybody more comfortable. You know that's actually...for all of the work that, um, Vaughan and Cleveland-Innes and Randy Garrison and Terry Anderson have done with Community of Inquiry, that's kind of missing in their research. Is that...humanistic...like...the comfort and all that preliminary work that needs to be done to make that Community of Inquiry a success.

Interviewer: Yeah. It sure it. Because, when you get it, you get it. But there are many students thrown into that situation who have no idea how to get into it. Yeah. They need to determine, or at least establish that comfort level.

Faculty 2: And I'm always flabbergasted because most of the student that take <course code> are near the end of the program. I don't know why, it just happens to be a course that they choose near the end of the Master's. And so they're all very, very experienced online learners, and yet so inexperienced with Community of Inquiry.

Interviewer: Strange.

Faculty 2: And that surprises me. So. And they're quite willing to participate in it, they feel really, they feel good coming out of <course code>, they do.

Interviewer: Oh, I can see that, yeah. I can see that from what they're saying.

Faculty 2: And a lot of them actually go on and join me again, I have a lot of repetitive students with <course code>, I teach <course name>. And that always makes me feel good when I see them signing up for that. And it's laid out quite differently, I helped design that, and it's a nicer layout, I think. <this course> needs a lot of work, and I've been working on it this year actually, um, it was designed a long time ago, <firstname> did a great job, <full name>, um, on the study guide but a lot of the stuff's getting dated so we're updating <course code> before the spring comes again.

Interviewer: OK, one more question: so your course design, the way you've got it laid out here, I see that the interaction patterns follow along nicely with the design, which basically just means that the students are doing what you're asking them to do. But do you feel like their activity could...like when you want to change the course design, would you want to change how much



time or how much activity they put into a lot of these elements? More time on this, less time on that, etc.

Faculty 2: That's one of the reasons why I've upped the participation grade to 20%. Because it's not going to say five forums. It's going to say regular participation. I don't like that five forum business because what they do is they choose five forums and then just stay out of the other four.

Interviewer: So you feel like they're missing out.

Faculty 2: And that's just typically a student, right, they're often taking more than one course, so the new participation is worth much, much more, so they'll put more value on it. And it will be every forum. But I also clarify with the on Skype that participation does not have to be this massive post, the semi-essay. I want discussion. I don't want pontifications, you know I want discussions. So I'd rather have 100 words from each student and all of them have posted three posts of 100 words with thoughts on a reading than the stupid, I'm sorry, but, it is, stupid academic requirements that they seem to perceive they need to do for these Master courses.

Where they, you know, they make this huge post and nobody else but the other keener even has the time to answer. And they've got seven more additional readings, no, there's enough readings <chuckle>. So they're not...they shouldn't be out to impress me, they should be out to discuss with each other what the...

Interviewer: It's good that you let them know in the beginning with that Skype, otherwise, you know, they're kind of conditioned to do that because that's what they've been doing.

Faculty 2: Yes, they are, they are. They're very much conditioned.

Interviewer: So, your decision to increase the participation grade weighting, is...uh, correct me if I'm wrong, but my impression is that that's really your subscription to the Community of Inquiry. The importance of it.

Faculty 2: Yes, and if it's not weighted...it doesn't matter if a learner is 7 or 90. Students all...learners all have the same profile, and they'll all behave in exactly the same way, and it doesn't matter if it's grade one or post-doctoral work. The weighting matters. You know, and 10% was almost like insignificant. I have had learners say, well, I'm just not going to participate, I'll just eat the 10%. Well they won't eat the 20%. <chuckles>.

Interviewer: That's true, there you go. OK, thank you so, so much for your time. This has been amazing, and I can't wait to write this up and share it with you and show you where we're going with it. Your participation was golden and I'm so thankful.

<candid chat>

End: 2:38pm