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- Students find value in transcripts based on their individual needs and which is managed by how they intend to use it in their learning.
- The value is characterized by their gender and degree levels, with a focus on both lower and higher-ordered thinking geared towards a sense of confidence-building of their own knowledge
- There is possible impact for EAL/D student learning
- Transcriptions maybe more appropriate when the teaching style is that of a traditional lecture as only one voice is being recorded.

**Title: Transcribing Accounting Lectures: Enhancing the Pedagogical Practice by
Acknowledging Student Behaviour**

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Transcribing accounting lectures: Enhancing the pedagogical practice by acknowledging student behavior

ABSTRACT

This study investigated how students demonstrated their use and need for lecture capture transcripts. Lecturers and students from two accounting subjects (i.e., a large first-year introductory class and a smaller graduate seminar series) participated. Students' stated how they used and needed the transcripts and these statements about behaviors were mapped to Blooms Taxonomy and Maslow's Hierarchy of Needs. Findings focussed on how lecture transcripts influenced the learning process for students and suggested that the design of courses and student characteristics do not negatively influence how students use these transcripts. Implications for the value of transcripts to a students' learning process is outlined with practical guides on how they can enhance pedagogical delivery while acknowledging the academic workload.

Keywords: lecture capture; transcripts; cognitive prompts; student behaviors

Transcribing accounting lectures: Enhancing the pedagogical practice by acknowledging student behavior

1. Introduction

Students having equitable access to lecture content is an ongoing challenge in today's classrooms (Jones, 2007; O'Callaghan et al., 2017). Lecturers still struggle with how to provide individualised learning paths for each student based on their needs (Burgstahler, 2011; National Center on Universal Design for Learning, 2013). Providing multiple avenues for students to address their understanding of the content and contributes to how they prepare and react in the learning environment (Aldamen et al., 2015; Kirkwood & Price, 2014; Phillips & Trainor, 2014). In response, university faculties support lecturers by providing lecture recordings as a solution to promoting access. Giving students access to lecture recordings, while still having conversations as to how students can best become actively engaged during lecture delivery (Jones, 2007; Kirkwood & Price, 2014; O'Callaghan et al., 2017) allows for an improvement to the learning environment. Although students do indeed value lecture recordings, understanding how the recordings can be used in the lecture design and delivery to encourage engagement is yet to be fully investigated (O'Callaghan et al., 2017).

To engage students, lecturers must make a variety of decisions that will influence how their courses progress in the required timeframe. This also impinges on what learning outcomes are provided and how they are successfully implemented and received (Dillenbourg, 2013). Some of these decisions may be influenced by the characteristics of students (i.e., perceived language literacy, cognitive abilities, digital literacy and citizenship, etc.) (Owston et al., 2011), the physical learning environment, any technology tools that may assist with the learning process, the design of the course and learning materials as well as the lecturer's own skill sets (Roschelle et al., 2013; Sharples, 2013). As such, understanding what a student brings to the learning environment is of equal importance. This importance

can contribute to what is learned by being influenced not only by the students' cognitive abilities but also how the learning content is designed and delivered (Hämäläinen et al., 2017) and then used and demonstrated to establish that learning has actually occurred (Alexander et al., 2009). As lectures are captured and made available to students, many become concerned with how the audio/video from the lectures are used and if there is any benefit for the students (Huang et al., 2016; Kent et al., 2018). Some faculties transcribe the lectures as a way to increase accessibility by providing the lecture in a text-based format (Camiciottoli, 2005, 2010), while others simply provide the recorded lecture in its original format. This creates for a specific inquiry as to what benefit an Accounting student would gain from using transcripts and how would it influence a lecturer who teaches into an Accounting program.

2. Literature review

The CPA report (2015), *Shaping the future of accounting in business education in Australia*, describes technology as a 'game-changer' for curriculum design and delivery. The report acknowledges this change as rapid and accelerated, affecting both lecturers and students (O'Connell et al., 2015). Blankley, et al. (2019) present an encouraging outlook, stating that accounting lecturers have made significant progress in the use of technology over the last two decades. Despite these changes, the pedagogical practice of *didactic* lecturing remains a core teaching practice within some universities and lecture capture assists some with these offerings (Schullery et al., 2011; Terry et al., 2015).

2.1. Cohort size and issues of access and equity for learning

Lecturers have identified a variety of challenges when teaching large cohorts (Schullery et al., 2011). These challenges include the inability to easily provide active learning opportunities (Lento, 2016), which can also affect the ability to measure key course and graduate learning outcomes (Stoner & Milner, 2010). Lecture capture technology solutions can provide an opportunity for lecturers to support students in the classroom as well

as throughout their academic tenure (Terry et al., 2015). Bain, et al. (2012) see transcripts that are produced from lectures as a means of supporting students who are not effective note-takers. Being an effective note-taker is a skill students can accomplish and the lack of this ability may be due to a disability, or perhaps, an under-developed skill as students transition from secondary schools to university (Kent et al., 2018). Providing lecture transcripts as learning materials can allow students to have access to course content in a different format, which in turn can provide increased pathways for students to create their own learning options. This delivers an equitable avenue for students with diverse needs to self-select how to be successful, as the process can proactively manage student needs by encouraging inclusive teaching practices (Landin, 2017; O'Connell et al., 2015; Tobin, 2018).

2.2. Learning for non-native language speaking students

While student cohorts become more diverse, English continues to be one of the most widely used international languages within the academic world (Huang et al., 2016). At the same time, the diversity of university cohorts illustrates characteristics which include many students for whom English is an additional language or dialect (EAL/D). Miller (2007) found that such students must work harder to comprehend lectures, while other reports suggest that these students are less likely to interact with lecturers or other students during face-to-face sessions (Barnes & Lock, 2010; Hodkinson & Poropat, 2014; Huang et al., 2016). This perceived communication barrier hinders the ability for EAL/D students to actualise their comprehension of course material, thus making them less active participants in the course environment. Therefore, the ability to access materials that may allow for an increase in understanding via transcripts could be key.

2.3. Cognitive thinking and gender

As students attempt to use course content, clear differences are seen when comparing how different genders may use a transcript. Use of a transcript can be linked to how motivated a student may be as they attempt to self-regulate their learning (Denton et al., 2002). Such motivation can suggest how a student may accomplish life-long learning skills, thus contributing to a course's/program's achievement of graduate outcomes (Denton et al., 2002; Lento, 2016; Stoner & Milner, 2010). Distinctions can be drawn regarding both motivation for use and task analysis as some studies reported that male students tended to use the transcripts for purposes relating to their basic psychological needs, while female students were motivated to being and feeling accomplished (Minton & Schneider, 1985). Other researchers such as Park, et al. (2019) found the effect of perceived usefulness of technology on the intention to use greater for males while Riding and Rayner (1998) suggest that although males tend to process information faster, they do so cognitively at a more superficial level than females who tend to be more thorough. Richardson and O'Shea's (2013) study into the habits of university students using technology found that males were slightly more likely to change their answers than females; again, suggesting female students may be more considered learners as they interact with course materials. This is consistent with other gender studies which have found men to be more task-oriented (Minton & Schneider, 1985) within context and thus allowing for considered approaches to how students can and do make meaning of their own learning. Thus, wanting to interact with course materials as a way to achieve deeper learning can be reviewed as a gendered approach in learning (Minton & Schneider, 1985; Richardson & O'Shea, 2013; Riding & Rayner, 1998).

2.4. Critical thinking and owning learning

As a lecturer, using Bloom's taxonomy— a metacognitive tool for scaffolding learning in situ, to measure a student's ability to critically think during the pedagogical process works to their benefit (Anderson et al., 2001). At the same time, as a lecturer measures what a

student learns, students would and should also be interested in what they themselves have learned. As the student progresses in the institution demonstrating the value of each learning asset and the respective contributions to ones [a student's] own learning process is pertinent to their own learning journey (Buckley et al., 2010; Owston et al., 2011). The use of lecture capture and the associated transcript for an on-campus lecture, can help moderate students' awareness of their own learning abilities. Transcripts may become that valuable artefact which assists students in their learning process. When the lecture capture is transcribed, the value of both the lecture recording and transcript increases with the acknowledgement that they can be accessed as needed (Owston et al., 2011). This therefore allows students to organise how it is used and for what purpose (Athanassiou et al., 2003; Berthold et al., 2007). The idea of organising when an artefact is used and the subsequent realisation that there is value in managing the benefits of accessing the content, speaks to elaboration strategies that are employed in the cognitive learning process (Berthold et al., 2007). By linking the artefact to the source of knowledge and then reviewing and monitoring the artefact's content with regards to what is needed for the learning process can be seen as a metacognitive strategy (Anderson et al., 2001; Athanassiou et al., 2003; Buckley et al., 2010). This provides an opportunity for the student to draw on their own motivation to learn by leveraging the value of the artefact to demonstrate how the learning content can be used in different formats (i.e., audio, video and text) (Anderson et al., 2001; Athanassiou et al., 2003; Buckley et al., 2010; Maslow, 1943).

As many accounting students experience lectures as a standard method of teaching (Phillips & Trainor, 2014, p. 519), using such technologies to capture and transcribe lectures, can enhance the pedagogical environment for lecturers (Author1, 2018). The combined effect of (a) improving and increasing access to lecture materials for at-risk students (Bain et al., 2012); (b) providing equity to students with disabilities such as a hearing impairment or

dyslexia (MacCullagh et al., 2017) and; (c) supporting students who have a native language other than that spoken in the lecture (Shadiev et al., 2016) makes for a supportive learning and teaching experience. This provokes a key question: *How are students using the transcripts in order to support their own learning?* Answers to this research question can provide general guidance to all lecturers who may want to consider using similar solutions in their teaching and it is particularly relevant for lecturers with large cohorts wishing to enhance their pedagogical practice.

3. Research Context

The research was conducted during a semester using two Accounting courses from an Australian university. The first course is an undergraduate course which has an enrolment of approximately 1,600 students and the other is a graduate course which has an enrolment of approximately 260 students. The undergraduate course had an international enrolment of 47% while the graduate course had 97% of students who were classified as international students. Lectures are automatically captured using lecture capture software and the resulting video and audio stored in the institutions learning management system (LMS). This process of lecture capturing occurred each week for both courses and the resulting video and audio was imported automatically into the LMS.

3.1. Course design and delivery

The undergraduate course had the same two-hour lecture which was delivered face-to-face multiple times each week to accommodate the large cohort. This course which was complemented by readings and an on-campus tutorial session, is also a core course for the majority of students as it provides an introduction to the field of accounting by teaching students key concepts such as financial statements and the use of accounting information. Assessments for this course includes three small individual tasks during the semester followed by a high-stakes exam at the end.

The graduate course offered one weekly class which was designed in more seminar format. The first five weeks of the class involved lectures and the final seven weeks ran as practice-oriented workshops. For the first five weeks, students attended a one-and-a-half-hour lecture twice a week. For the remaining seven weeks, students participated in workshops, during which time they drew on the theoretical knowledge gained during the first half of the semester. This course provided graduate students with a general introduction to business processes which generates accounting data. As part of the curriculum, students gained an understanding of information systems that support business processes. They also developed the skills necessary to analyze business data and make recommendations to improve efficiency. Assessments in this course comprised of an individual task, group task and a final examination.

3.2. Method

This research study used a mixed-method approach to determine not only how often the transcripts were accessed, but also to gauge how the students used them. The research was conducted in three phases:

- Phase 1. the producing and publishing of the transcripts;
- Phase 2. surveying the students' behaviors towards the transcripts
- Phase 3. analysing of the surveys using priori codes and the LMS analytics

These three phases ensured that the data was strategically capturing behavior as a way to ensure via a triangulation that the data was reliable and valid.

3.2.1. Producing and storing transcripts for access

After the audio and video of a lecture was automatically updated in the LMS by the lecture capture software, the audio file was downloaded and sent to a transcription service. For the undergraduate course, the lecturer would review all of the lectures that were recorded that week and as part of their workload, select one to be transcribed. For the graduate course,

because there was only one lecture, there was no need for a selection process. For this study, it was decided that a one-week turnaround in the production and publishing of each lecture transcript was ample. So, a reputable commercial service was commissioned to provide transcripts within four business days. Upon availability in the commercial service’s virtual folder, the validity of each transcription was member-checked by the researcher, the instructor and the instructor’s head tutor to ensure that basic formatting was applied to the document and then initially shared with students on the LMS (Creswell & Miller, 2000). While checking the validity of each transcript the number of inaudible notations-was noted and remedied to ensure that jargon, acronyms, slang or homonyms were recorded as accurately as possible (see Table 1). This process allowed for some level of assurance that the lecture content matched what was actually said and not what the transcription service documented. Once the review of the transcript was completed, it was uploaded to the LMS by the lecturer as a pdf document, made available to the students and tracked using the LMS tracking views capability (see Fig. 1).

Table 1
Example of inaudible notations.

<i>What was said by the lecturer</i>	<i>What was recorded by the transcriber</i>
collated	collided
ARA	IRA
EBIT	ever
We right?	we write
ROA	arrow a
sale	sail
Fair dinkum	“Inaudible comment”
asset	acid

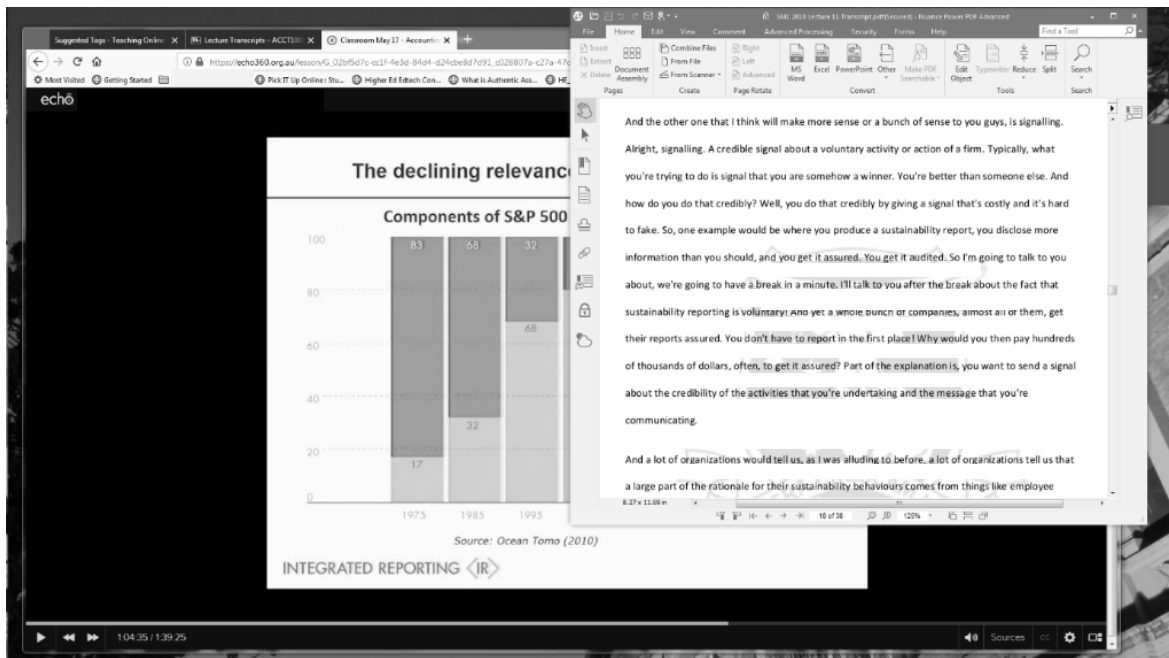


Fig. 1. Example of a weekly lecture capture recording for the undergraduate course with transcript.

3.3. Surveying students on their behavior

At the end of the teaching period, the students were surveyed as to whether they used the transcripts and if so, they were asked to respond using two prompts (Kuo et al., 2012; Shadiev et al., 2016). The first prompt acted as a cognitive prompt by asking the student to complete the statement “I used the transcripts to....” and the second prompt acts as a metacognitive prompt by asking the student to elaborate on their first response by answering “The transcripts had...”. Both of these prompts were used to align the students behaviors towards their use of the transcripts to Blooms Taxonomy (2001) and the subsequent value of the transcripts to the students, to Maslow’s Hierarchy of Needs (1943).

3.3.1. Analysing the surveys

Content analysis methods were used on the responses to systematically code themes that can be mapped to Blooms Taxonomy and Maslow’s Hierarchy of Needs (Anderson et al., 2001; Athanassiou et al., 2003; Maslow, 1943). Both of these frameworks allowed for the

self-reported descriptions to classify students' behaviors based on their needs and use the levels in the frameworks as priori codes (See Fig. Fig 2). The responses were divided into those who used the transcripts and those who did not use the transcripts. Two coders then coded 10% of each of the responses together and 10% of each of the responses individually to ensure the reliability and validity of the coding process. The reliability of the coded responses reached 90% with the threshold being at least 75% (Nunnally & Bernstein, 1994). The first prompt in the survey was coded using Bloom's taxonomy because it answered the question of how the transcript was used. Each of Bloom's levels responded to a code: 1) Remember, 2) Understand, 3) Apply, 4) Analyze, 5) Evaluate and 6) Create. The second prompt in the survey was coded using Maslow's Hierarchy of Needs because it answered the question of why the transcript was used. Both of these responses were coded for each student and then each student's *cognitive* behavior was mapped to why they used the transcripts. In the coding of the second metacognitive prompt, there were three priori codes 1) physiological and safety, 2) belonging and esteem and 3) self-actualisation. If a response included descriptors which suggested that the student used the transcript to understand and then apply, the response was coded as an *application* response. This method helped illuminate whether the students felt the transcripts were valuable to them and if so why. Once these were coded, a sankey diagram was used to illustrate the linkage between the use and the need to use (Lee & Tan, 2017). Sankey diagrams, sometimes called alluvial diagrams, are typically used to show the flow of energy in the science discipline (Schmidt, 2008). It is typically used to show efficiencies within a system or the change in structural systems. It is used in this study to illustrate a relationship between a student's demonstrated behavioral with their cognition. This data along with the LMS analytics ensured that access reported by students was meaningful within the context of the course (Creswell, 2007).

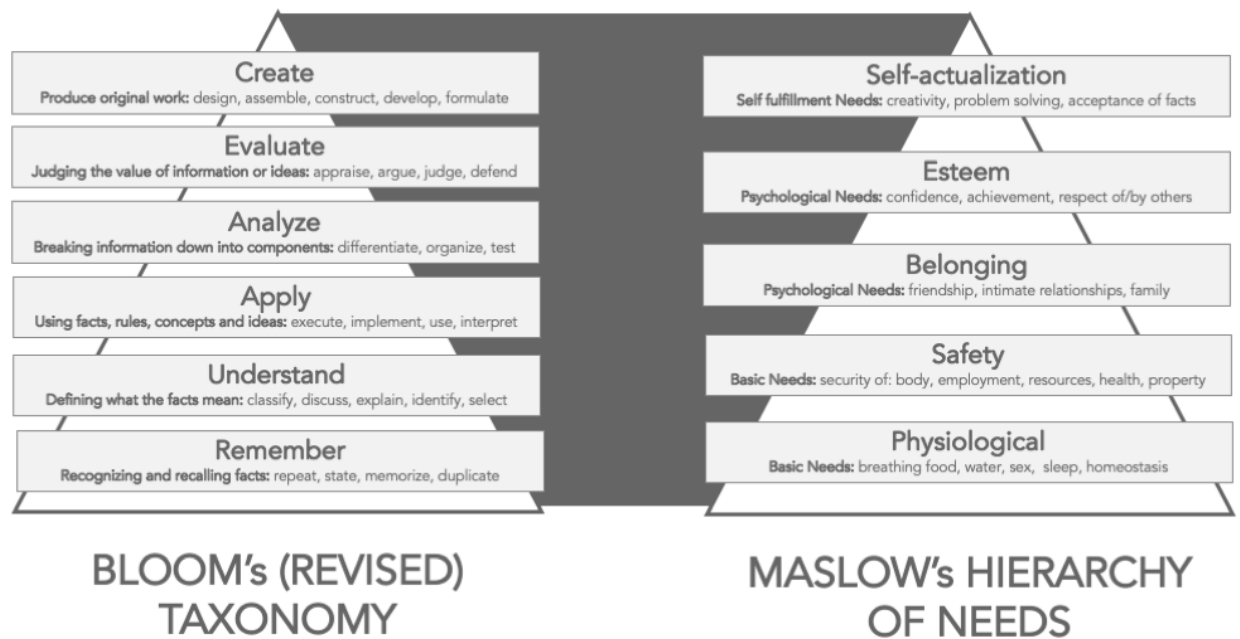


Fig. 2. Blooms taxonomy of learning and Maslow's hierarchy of needs.

4. Findings

In total, 248 students responded to the end of semester survey asking about their behaviors towards the transcripts. Of the total number of respondents, 88% were undergraduates and 12% were postgraduates. Based on gender, 64% of respondents were female, 34% male and 2% preferred not to say. When reviewing gender by cohort, 68% of undergraduates who used the transcripts identified as female, 31% identified as male and 1% preferred not to say. In the postgraduate cohort, 72% of students using the transcripts identified as female and 28% identified as male. Both sets of students accessed the individual recordings throughout the semester and the LMS analytics reported an average of 2,676 weekly hits from the undergraduate students (see Fig. 3) accessing transcripts and an average of 528 weekly hits from the graduate students (see Fig. 4). They were downloaded most frequently during the first week of availability with an increase in access at the end of semester.

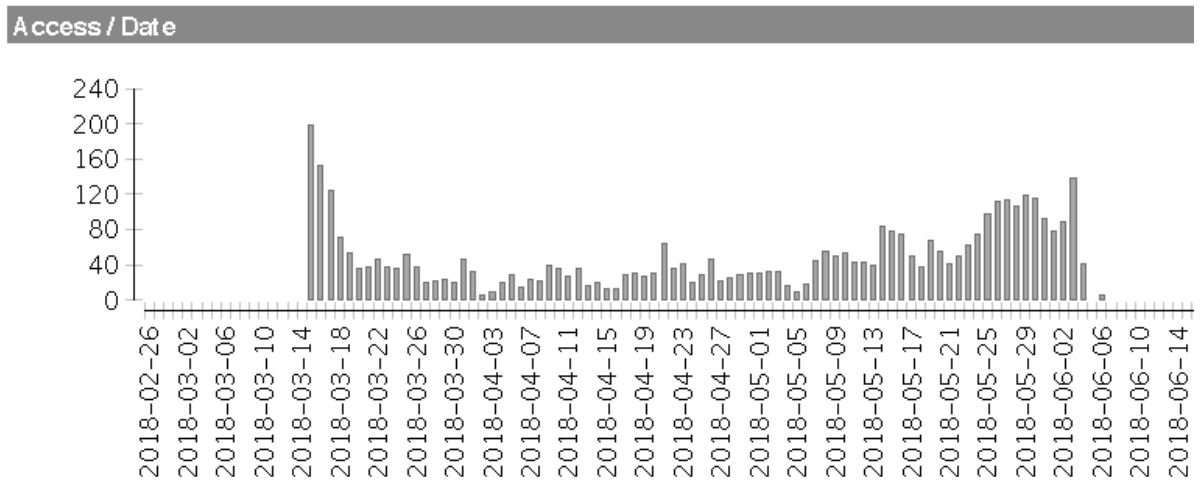


Fig. 3. Undergraduate student access for the lecture 1 transcript.

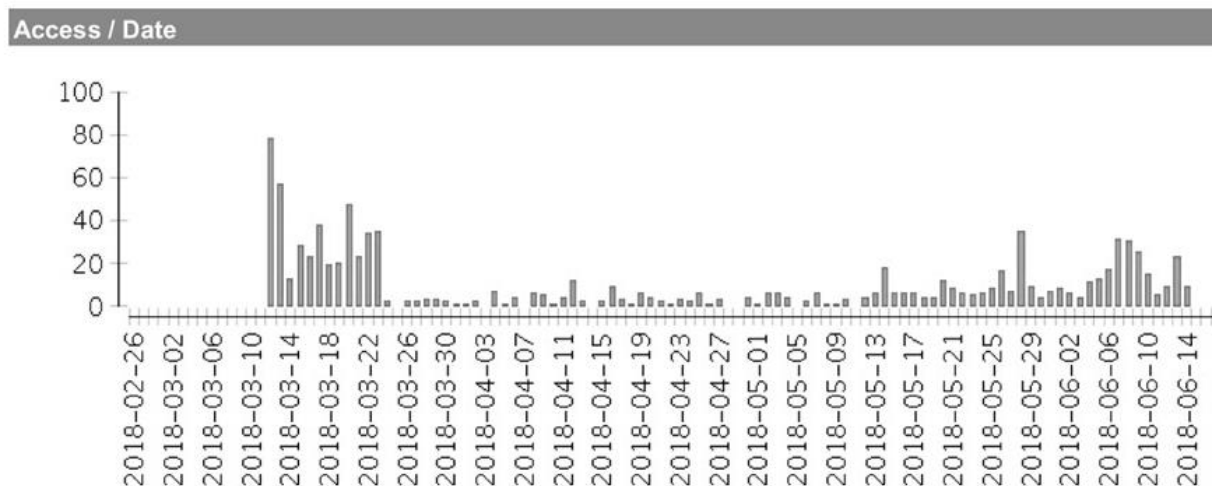


Fig. 4. Graduate student access for lecture 1 transcript.

While 248 students responded to the survey, only 180 students stated that they used the transcripts. Of the 180 students 112 completed both the cognitive prompt “*I used the transcripts to...*” and the metacognitive prompt “*The transcripts had...*”. Students who used the transcripts spoke of their learning behaviors and the responses were mapped using the highest level of either the Taxonomy or Hierarchy exhibited. Some students felt that they used the transcripts to support their cognition needs (i.e., 57 students used them to remember or understand and 55 students used them to apply, analyze or evaluate) and felt that this

mostly affirmed what they had learned by making them feel complete (i.e., self-actualisation) and assured (i.e., belonging and esteem) while a few felt that the transcripts just supported their basic needs (i.e., only 19 had basic needs) (see Fig. 5).

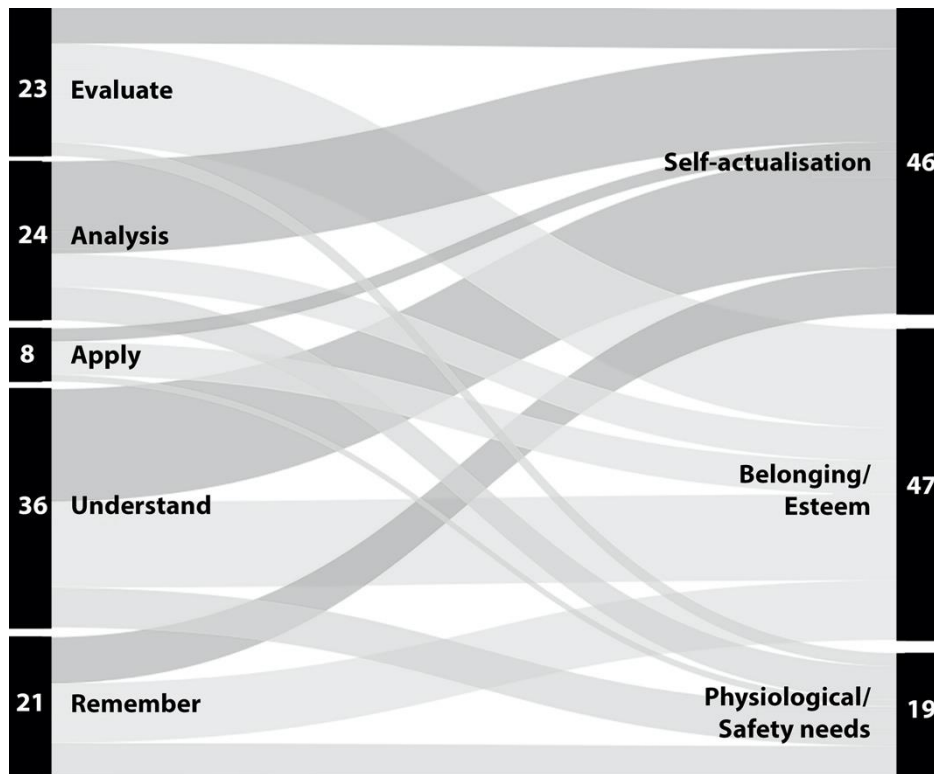


Fig. 5. Sankey Diagram showing the students linking their use of their transcripts to the value of the transcripts.

An example of a student’s response which showed that they were looking for the ability to review (i.e., analyze) their work as a way to confirm their understanding (i.e., physiological or safety needs) is as follows:

I used the transcripts to “...review.”

The transcripts had “...outline of the lecture”

Another example of a student’s response which showed that they were looking for basic guidance (i.e., remember) in an effort to be self-assured (i.e., belonging/esteem) is as follows:

I used the transcripts to “...*follow along to the lecture.*”

The transcripts had “...*detail and accuracy to follow along with the lecture*”

A third example of a student’s response which showed that they were looking for the ability to apply their knowledge so that their understanding could be complete (i.e., self-actualisation) is as follows:

I used the transcripts to “...*write down the key points that cannot identify clearly through the speech.*”

The transcripts had “...*it is really useful especially for the international students, as we can pick up some important points from the transcripts*”

4.1. Behaviors by degree level

There were 97 undergraduates and 15 graduate students who used the transcripts and answered both prompts. Based on cohorts, both degree levels used the transcripts for lower-ordered (i.e., 40 undergraduate students and 7 graduate used to remember or understand) and higher-ordered cognitions as it would increase their confidence in their knowledge by boosting their self-esteem and allowing them to achieve their full potential (i.e., only 16 undergraduate students and three graduate students had basic needs) (see Fig. 6).

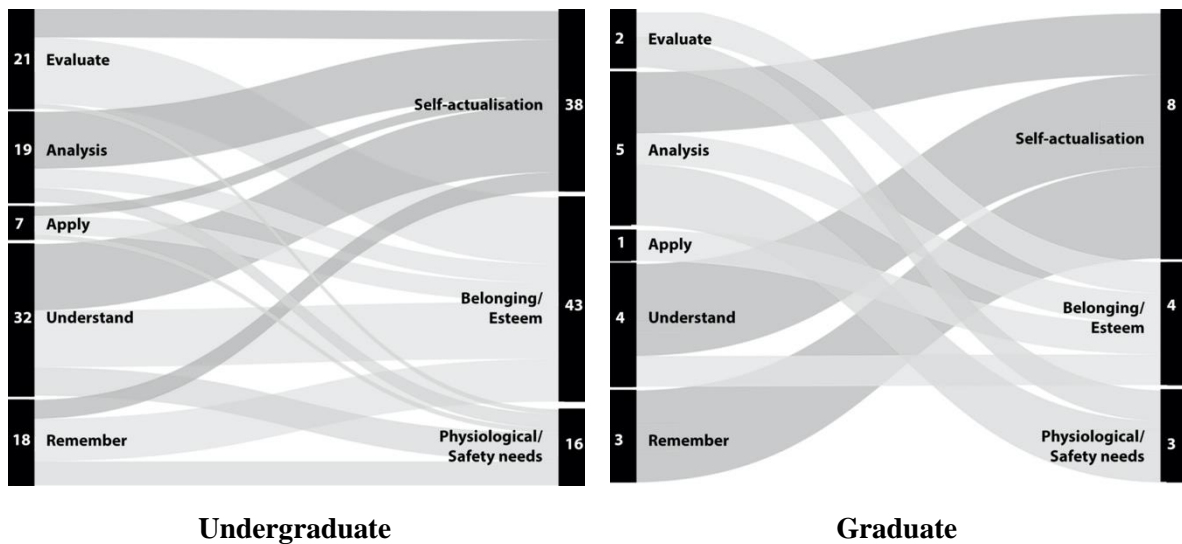


Fig. 6. Sankey Diagram showing the students linking their use of their transcripts to the value of the transcripts by degree level.

An example of an undergraduate student's response which showed that they were looking for the ability to just remember the content as a way to feel accomplished (i.e., belong/esteem needs) is as follows:

I used the transcripts to "...*make notes.*"

The transcripts had "... *been very helpful*"

Another student was looking to the transcripts as a way to revise work towards a confirmation of what they understood:

I used the transcripts to "...*revise over material (post lecture) - instead of going through the capture and having to find the exact spots make notes.*"

The transcripts had "... *what the lecturer was saying and a good impact on the way I comprehended things*"

At the same time, an example of a graduate student's response which showed that they were going to use the content at a higher-order (i.e., for analysis) in an effort to support their basic needs (i.e., physiological/safety needs) is as follows:

I used the transcripts to "...*review.*"

The transcripts had "...*great*"

Another student used the transcripts to remember what was said as a way to ensure that their understanding was complete:

I used the transcripts to "...*find out any unclear matter I heard on Lecture Capture.*"

The transcripts had "...*helped me to get more understanding of the lecture content.*"

4.2. Behaviors by gender

There were 77 female students and 33 male students who used the transcripts and answered both of the prompts. Two students elected not to self-identify their gender. Female students almost equally used the transcripts for lower-ordered cognition compared to higher-ordered cognition with 38 students who used them to remember and understand; whereas 39 students used it to apply, analyze and evaluate. But only 19 female students had basic needs for the transcripts while 58 students needed them to assure their own knowledge. Male students were almost similar in their approach to how they used the transcripts with 18 students using them to remember or understand and 15 students using them to apply, analyze or evaluate. Only nine of the male students had a basic need for the transcript while 24 students needed it to assure their own knowledge (see Fig. 7).

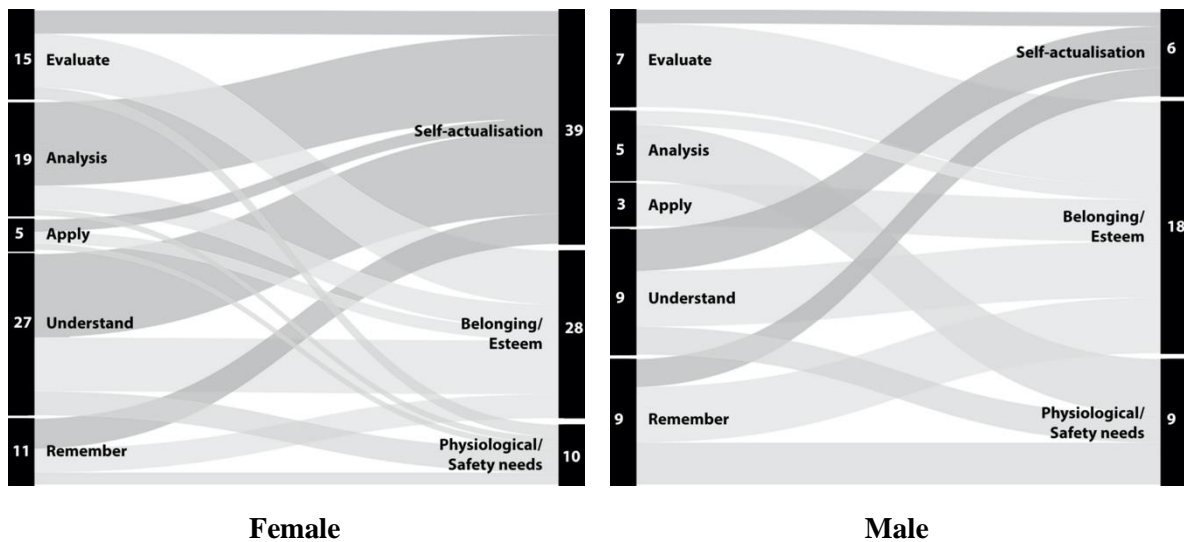


Fig. 7. Sankey diagram showing the students linking their use of transcripts to the value of the transcripts by gender.

An example of a female and male student’s response which showed that they were looking to remember the lecture as a way to fulfil basic needs is as follows:

Female

I used the transcripts to “...*check the lecturer’s said.*”

The transcripts had “... *many details.*”

Male

I used the transcripts to “...*find keywords.*”

The transcripts had “... *all the words said by the lecturer.*”

At the same time, an example of a female and male student’s response which showed that they were going to use the content at a higher-order of cognition (i.e., apply, analyze or evaluate) in an effort to feel accomplished is as follows:

Female

I used the transcripts to “...*help me get access the concepts of each topic and use them to make an overall revision.*”

The transcripts had “... *clear interpretation of key concepts and relevant useful examples related to each topic.*”

Male

I used the transcripts to “...*revise slides and add to my notes when I didn't have time to listen to the whole lecture. I could also search specific terms within the text to see if my lecturer had mentioned anything about it. They are extremely helpful.*”

The transcripts had “... *a clear description of everything in the slides that may have been vague. Seeing the explanation in words and being able to follow on is more helpful than listening retrospectively.*”

4.3. Behaviors by degree level and gender

At the undergraduate level there were 66 female and 29 male students who used the transcripts and answered both of the prompts, compared to the graduate level, where they were 11 female and four male students who used the transcripts and answered both of the prompts. Undergraduate females used the transcripts equally for lower-ordered and higher-ordered cognition (i.e., 32 students used to remember or understand and 34 used to apply, analyze or evaluate) with most of them trying to make themselves feel accomplished (i.e., only nine had basic needs. Undergraduate males similarly used the transcripts like their undergraduate counterparts almost equally for lower-ordered and higher-ordered cognition (i.e., 12 students used to remember or understand and 17 used to apply, analyze or evaluate) with most of them also trying to make themselves feel accomplished (i.e., only seven had basic needs) (see Fig. 8).

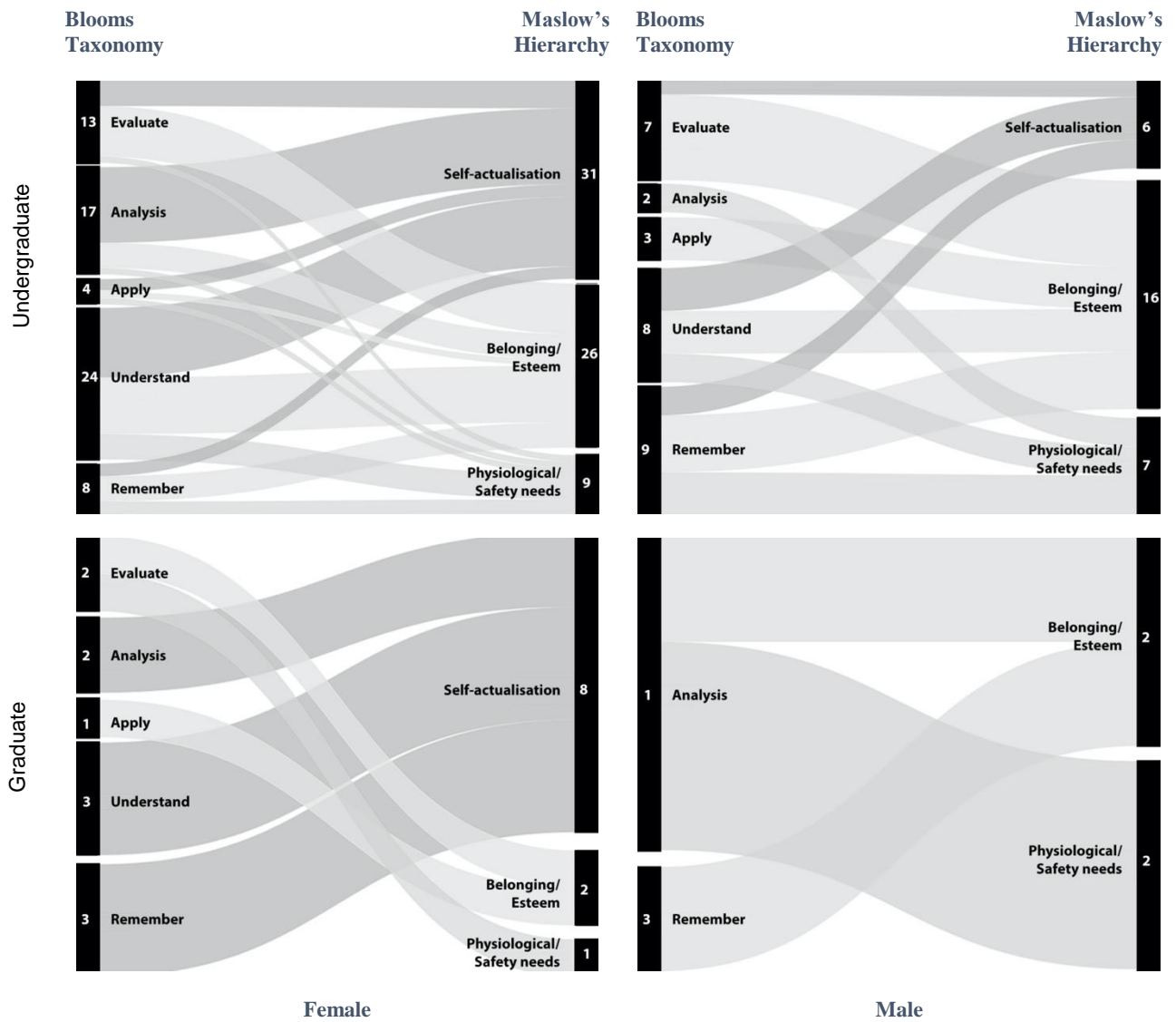


Fig. 8. Sankey diagram showing the students linking their use of their transcripts to the value of the transcripts by degree level and gender.

An example of a female undergraduate student's response which showed that she was looking for general understanding as a way to have a complete understanding of the content (i.e., esteem) is as follows:

I used the transcripts to "...clarify terminology in the course."

The transcripts had "... Detailed notes to follow along while reviewing lectures."

At the same time, an example of a male undergraduate student's response which showed he was going to use the content at a higher-order of cognition (i.e., analyze) in an effort to support their basic needs (i.e., physiological/safety needs) is as follows:

I used the transcripts to “...*review and go over what I missed in the lecture*”

The transcripts had “...*been awesome.*”

An example of a female graduate student's response which showed she was looking for general understanding as a way to have a complete understanding of the content (i.e., self-actualisation) is as follows:

I used the transcripts to “...*understand the lecture.*”

The transcripts had “... *helped me.*”

At the same time, an example of a male undergraduate student's response which showed that he was going to use the content at a lower-order of cognition (i.e., understand) in an effort to feel accomplished (i.e., esteem) is as follows:

I used the transcripts to “...*refer to when was not understanding a concept*”

The transcripts had “...*good information.*”

Overall the use of the transcripts supports a general understanding of lecture content while providing students with a tool to affirm their learning. Many students did use the transcripts for higher-level cognitive needs (i.e., approximately 59 students used it to apply, analyze and evaluate) with an increasing number using them for more than a basic need (i.e., approximately 91 students used it for belonging/esteem or self-actualisation needs).

5. Discussion

Kirkwood and Price (2014) point out that many of those who teach use technology to sustain existing practice rather than to transform the learning experience. This is certainly the

case with lecture capture. As with other studies examining the use of transcripts within education (Huang et al., 2016; Shadiev et al., 2016; Wald & Bain, 2008) a variety of student learning behaviors were identified. While investigating how EAL/D students use lecture transcripts, Shadiev et al. (2016) recorded nineteen different learning strategies, broadly falling under three categories: *to understand the topic presented*, *to find an answer* and *to write summaries*. This study coded how students used the transcripts to the Blooms taxonomy (2001) and similarly identified the first five levels of the taxonomy as recognisable behaviors (i.e., remember, understand, apply, analyze and evaluate). The value that was stated in the surveys, when the responses were coded against Maslow's Hierarchy of Needs (1943), suggest the transcripts played a significant role in assuring students of their own learning practices, thus providing them with what they perceived to be a support system for their learning activities.

5.1. Benefits to the student

It is interesting to note that none of the students within this study suggested transcripts be used in isolation or as a substitute for lecture attendance or even the viewing of lecture recordings; a claim further supported by students who reported searching the transcripts for terminology to improve understanding. This is consistent with research into the effective use of lecture recordings (Denton et al., 2002; Lento, 2016; Miller, 2007; Stoner & Milner, 2010). According to Owston, et al. (2011), high achieving students tend to view only parts of lecture recordings while lower achievers tend to view the entire lecture recording. The conclusion is that the recordings complement the on-campus lectures. Similarly, students within this study used the lecture transcripts with a purpose in mind. Of equal interest was the distribution of how and why students used the transcripts with respect to degree level and gender. When reviewing the number of LMS access hits, it was seemingly of more interest to graduate students. For example; the graduate course LMS site recorded close to 80 hits (with

approximately 260 students) at first availability. This is in contrast to the undergraduate course which recorded close to 200 hits (with approximately 1600 students) when the first lecture transcript was made available.

5.3. Additional behaviors

Approximately 10% of the respondents implied that they needed the transcripts because they could not understand what was being said in the lecture. Words used in such responses include “clarify”, “clear”, “English” and “international”. While the words themselves are not sole indicators that EAL/D may have been an additional contributor to the use or need, the context in which the words were used does suggest that some students had problems understanding the lecture. This creates an opportunity to revise the research design in that behaviors should be first measured based on “needs” and then on what cognitive decisions are made to ensure that the “need” is met. Thus, suggesting that the original design should truly reflect the position of looking at Maslow’s Hierarch of Needs first and then proceeding to how to address the need using Bloom’s Taxonomy (see Fig. 9 below).

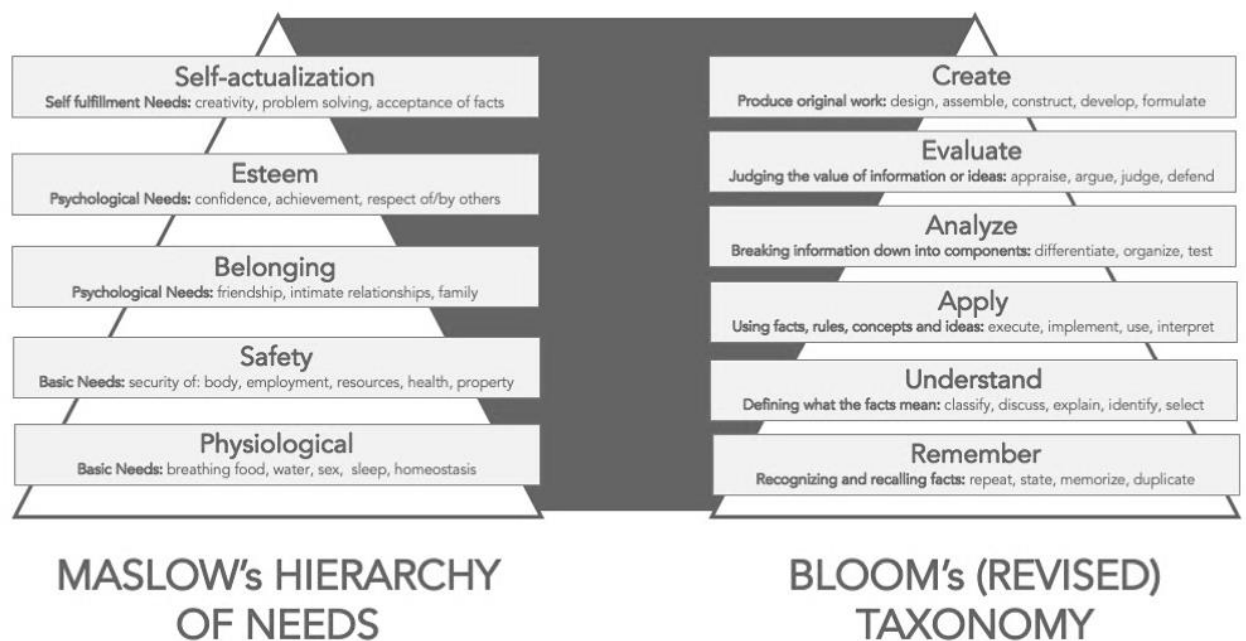


Fig. 9. Framing student’s behavior based on Maslow’s Hierarchy of Needs and then Blooms Taxonomy.

5.4. Pedagogical design and technology considerations

While this study featured the behaviors of students, it also identified practical considerations for lecturers considering such a strategy. One suggestion is that lecturers guide students in their use of both lecture captures and accompanying transcripts. The pedagogical design and delivery of a course must also be considered as the undergraduate course differed in design from the graduate course. The undergraduate course was delivered using a traditional lecture spoken by one person, while the lecturing style within the graduate course is more of a discussion; often involving student input. Since only the lecturer was wearing a microphone, student voices were not captured at a high quality. As a result, the transcript would often read ‘inaudible student voice’. Comparisons between the undergraduate and the graduate transcripts illustrate the importance of one’s lecture style. The undergraduate transcripts produced from approximately two hours of lecturing contained 15,000 to 17,000 words, while graduate lecture recordings were between fifty and ninety minutes in length with word counts between 4,500 and 9,400. In the undergraduate transcripts, the number of inaudible notations made by the transcribers ranged from one to twenty-four. The number of inaudible notations made in the graduate transcripts ranged from fifty-two to one hundred twenty-seven.

It is important to note that a low instance of inaudible notations does not necessarily mean the transcript is accurate. As illustrated earlier (see Table 1), transcribers misheard words regularly. This may have been due to professional jargon, acronyms, slang or homonyms. Proof-reading and editing of lecture transcripts are also a major issue. This can take as long as the original lecture (reading the transcript draft while listening to the lecture), plus the time required to make corrections. Formatting the text requires inserting punctuation and paragraph breaks to correspond with topic changes. Basically, the editor must be aware of content as well as grammar and the conventions of speech versus written text. Students

within this study had several suggestions to improve the readability of the transcripts including the insertion of headings and subheadings, and the identification of corresponding presentation slides. While these things may be useful, such production requirements might not be sustainable.

5.5. Considerations for using this in pedagogical practice

The results of this study show that technology alone cannot be relied upon to produce lecture transcripts. Off-the-shelf speech to text recognition (STR) technology is not yet capable of delivering accurate results for such a large audio recording. To ensure students are receiving a quality product, transcripts created through a commercial service must be proofread, edited and formatted before publishing to students. As a result, the practicality of lecture transcripts and the opportunities afforded students must be considered carefully. Several factors weigh in when determining the sustainability of lecture transcripts. This includes things such as class size, student demographics and production support; to name just a few (Bain et al., 2012; MacCullagh et al., 2017; Shadiev et al., 2016).

5.5.1. Pedagogical design and delivery

Comparisons between the undergraduate and the graduate course illustrate the importance of considering one's lecture style. Transcriptions may be more appropriate when the teaching style is that of a traditional lecture – one voice being recorded. Classes delivered as seminars, as in the case of many postgraduate offerings may need to rethink how to make the lecture capture more effective. These considerations are to accommodate sessions where the lecturer may be leading a discussion with students and their [the students] voices may not be captured.

5.6. Limitations of the study

The data collected in this study, was restricted to only one semester thus the ability to create sufficient generalisations is minimal. Likewise, it is also difficult to suggest that

student grades can and were influenced by the availability of use of transcripts. Investigation the influence of access and use to grades while not being a key purpose of the student can be a further consideration for the researchers. The main purpose of the study was to focus on the value proposition of the transcripts thus highlighting how equitable access for all students can be reviewed, discussed and accommodated using existing solutions.

There is a risk that this study may suggest to some that using technology within the lecture delivery process will be beneficial to the learning process. This message is not and should not be gleaned from this paper. The use of technology in learning and teaching should be relegated to key purposes and of course the value attained from the learning design process (Clark, 1983; Reiser, 1994). Ensuring that the message that technology by itself cannot afford learning is key to this argument and will continue to contribute to the foundational belief that the outcome of learning is a process that evolves from numerous factors and not just the use of technology and subsequent associations of such.

5.7 Implications for future research

It is suggested that lecturers consider how they wish students to use both lecture recordings and accompanying transcripts (Nordmann et al., 2018). Such a combined approach could be employed to promote a more active student attitude toward lecturing; and as such is worthy of further examination. Strategically investigating student use and need of transcripts throughout the semester as opposed to just at the end of the semester could possibly highlight areas in the course content where more scaffolding might be beneficial. Managing this strategy with the ability to implement more inclusive pedagogical practices based on varying student characteristics with different sizes of cohorts can also be a key factor for consideration (Aldamen et al., 2015).

6. Conclusion

Lectures, by definition, can be seen as being passive in pedagogical delivery with this practise being quite commonplace in accounting courses (Hall et al., 2004). This study focused on student use of lecture transcripts to identify potential benefits and opportunities for autonomous learning and the influence this use has on instructor academic practice. By examining student behaviors, it justifies rethinking the popular practice of just capturing on-campus lectures, with the hope of elaborating on how the audio/video can contribute to the active learning progress. The findings showed that course artifacts (i.e. lecture transcripts) are only valued by students if there is a belief that it will help them achieve their own goals (Denton et al., 2002; Maslow, 1943). This is then further appreciated if lecturers accommodate this practice as part of the intended design for the learning process (Anderson et al., 2001; Athanassiou et al., 2003). While this study does not suggest abandoning the tradition of on-campus lectures, it does acknowledge the advice given by Pincus, et al. (2017). They encourage accounting educators to strategically leverage technology within both their curriculum and pedagogy. While highlighting the urgency of this need, they cite changing student demographics and major technological advances as just two driving forces. Using transcripts in conjunction with lecture capture speaks to several of these issues.

This study shows that the practicality of lecture transcripts and the opportunities afforded students must be considered carefully. Several factors (i.e., delivery style, student demographics and production support) weigh in when determining the sustainability of lecture transcripts. Understanding that there is benefit in students having access to transcripts and thus strategically capitalising on how this can enhance the pedagogical delivery is key to lecturers and faculties alike. By further review of student characteristics which are typical for accounting courses more value can be determined and thus attributed to the inclusive practice of providing transcripts of lectures.

References

- Aldamen, H., Al-Esmail, R., & Hollindale, J. (2015). Does Lecture Capturing Impact Student Performance and Attendance in an Introductory Accounting Course? *Accounting Education*, 24(4), 291–317. <https://doi.org/10.1080/09639284.2015.1043563>
- Alexander, P., Schallert, D., & Reynolds, R. (2009). What is learning anyway? A topographical perspective considered. *Educational Psychologist*, 44(3), 176–192.
- Anderson, L. W., Krathwohl, D. R., & Bloom, B. S. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Allyn & Bacon.
- Athanassiou, N., McNett, J. M., & Harvey, C. (2003). Critical Thinking in the Management Classroom: Bloom's Taxonomy as a Learning Tool. *Journal of Management Education*, 27(5), 533–555. <https://doi.org/10.1177/1052562903252515>
- Bain, K., Lund-Lucas, E., & Stevens, J. (2012). 22. transcribe your class: Using speech recognition to improve access for at-risk students. *Collected Essays on Learning and Teaching*, 5, 126–131.
- Barnes, B., & Lock, G. (2010). The Attributes of Effective Lecturers of English as a Foreign Language as Perceived by Students in a Korean University. *Australian Journal of Teacher Education*, 35(1). <https://doi.org/10.14221/ajte.2010v35n1.2>
- Berthold, K., Nückles, M., & Renkl, A. (2007). Do learning protocols support learning strategies and outcomes? The role of cognitive and metacognitive prompts. *Learning and Instruction*, 17(5), 564–577.
- Blankley, A., Kerr, D., & Wiggins, C. (2019). An Examination and analysis of technologies employed by accounting educators. *The Accounting Educators' Journal*, 28.
- Buckley, C. A., Pitt, E., Norton, B., & Owens, T. (2010). Students' approaches to study, conceptions of learning and judgements about the value of networked technologies. *Active Learning in Higher Education*, 11(1), 55–65. <https://doi.org/10.1177/1469787409355875>
- Burgstahler, S. (2011). Universal design: Implications for computing education. *ACM Transactions on Computing Education (TOCE)*, 11(3), 19.

- Camiciottoli, B. C. (2005). Adjusting a business lecture for an international audience: A case study. *English for Specific Purposes, 24*(2), 183–199.
- Camiciottoli, B. C. (2010). Meeting the challenges of European student mobility: Preparing Italian Erasmus students for business lectures in English. *English for Specific Purposes, 29*(4), 268–280.
- Clark, R. (1983). Reconsidering research on learning from media. *Review of Educational Research, 53*(4), 445–459.
- Creswell, J. W. (2007). *Qualitative inquiry & research design* (2nd ed.). Sage Publications.
- Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice, 39*(3), 124–130.
- de Alvarez, M. S., & Dickson-Deane, C. (2018). Avoiding Educational Technology Pitfalls for Inclusion and Equity. *TechTrends, 62*(4), 1–9.
- Denton, L. F., Doran, M. V., & McKinney, D. (2002). *Integrated Use of Bloom and Maslow for Instructional Success in Technical and Scientific Fields. 12.*
- Dillenbourg, P. (2013). Design for classroom orchestration. *Computers & Education, 69*, 485–492.
- Hall, M., Ramsay, A., & Raven, J. (2004). Changing the learning environment to promote deep learning approaches in first-year accounting students. *Accounting Education, 13*(4), 489–505.
- Hämäläinen, R., Kiili, C., & Smith, B. E. (2017). Orchestrating 21st century learning in higher education: A perspective on student voice. *British Journal of Educational Technology, 48*(5), 1106–1118. <https://doi.org/10.1111/bjet.12533>
- Hodkinson, C., & Poropat, A. (2014). Chinese students' participation: The effect of cultural factors. *Education+ Training, 56*(5), 430–446.
- Huang, Y.-M., Shadiev, R., & Hwang, W.-Y. (2016). Investigating the effectiveness of speech-to-text recognition applications on learning performance and cognitive load. *Computers & Education, 101*, 15–28.

- Jones, S. E. (2007). Reflections on the lecture: Outmoded medium or instrument of inspiration? *Journal of Further and Higher Education*, 31(4), 397–406.
- Kent, M., Ellis, K., Latter, N., & Peaty, G. (2018). The case for captioned lectures in Australian higher education. *TechTrends*, 62(2), 158–165.
- Kirkwood, A., & Price, L. (2014). Technology-enhanced learning and teaching in higher education: What is ‘enhanced’ and how do we know? A critical literature review. *Learning, Media and Technology*, 39(1), 6–36.
- Kuo, T. C., Shadiev, R., Hwang, W.-Y., & Chen, N.-S. (2012). Effects of applying STR for group learning activities on learning performance in a synchronous cyber classroom. *Computers & Education*, 58(1), 600–608.
- Landin, J. M. (2017). Accessible Business Instruction (ABI): A New Model for Business Education. *Journal of Higher Education Theory and Practice*, 17(7), 96–105.
- Lee, A. V. Y., & Tan, S. C. (2017). Understanding idea flow: Applying learning analytics in discourse. *Learning: Research and Practice*, 3(1), 12–29.
<https://doi.org/10.1080/23735082.2017.1283437>
- Lento, C. (2016). Promoting active learning in introductory financial accounting through the flipped classroom design. *Journal of Applied Research in Higher Education*, 8(1), 72–87.
- MacCullagh, L., Bosanquet, A., & Badcock, N. A. (2017). University students with dyslexia: A qualitative exploratory study of learning practices, challenges and strategies. *Dyslexia*, 23(1), 3–23.
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370.
- Miller, L. (2007). Issues in lecturing in a second language: Lecturer’s behaviour and students’ perceptions. *Studies in Higher Education*, 32(6), 747–760.
- Minton, H. L., & Schneider, F. W. (1985). *Differential psychology*. Waveland Press Inc.

- National Center on Universal Design for Learning. (2013). *UDL Guidelines 2.0 | National Center On Universal Design for Learning*. National Center on Universal Design for Learning.
<http://www.udlcenter.org/aboutudl/udlguidelines>
- Nordmann, E., Kuepper-Tetzl, C. E., Robson, L., Phillipson, S., Lipan, G., & McGeorge, P. (2018). *Lecture capture: Practical recommendations for students and lecturers*.
- Nunnally, J., & Bernstein, I. (1994). *Psychometric Theory* (3rd ed.). McGraw-Hill Humanities/Social Sciences/Languages.
- O'Callaghan, F. V., Neumann, D. L., Jones, L., & Creed, P. A. (2017). The use of lecture recordings in higher education: A review of institutional, student, and lecturer issues. *Education and Information Technologies*, 22(1), 399–415.
- O'Connell, B., Carnegie, G., Carter, A., de Lange, P., Hancock, P., Helliard, C., & Watty, K. (2015). *Shaping the future of accounting in business education in Australia*.
- Owston, R., Lupshenyuk, D., & Wideman, H. (2011). Lecture capture in large undergraduate classes: Student perceptions and academic performance. *The Internet and Higher Education*, 14(4), 262–268.
- Park, C., Kim, D., Cho, S., & Han, H.-J. (2019). Adoption of multimedia technology for learning and gender difference. *Computers in Human Behavior*, 92, 288–296.
- Phillips, C. R., & Trainor, J. E. (2014). Millennial students and the flipped classroom. *ASBBS Proceedings*, 21(1), 519.
- Pincus, K. V., Stout, D. E., Sorensen, J. E., Stocks, K. D., & Lawson, R. A. (2017). Forces for change in higher education and implications for the accounting academy. *Journal of Accounting Education*, 40, 1–18. <https://doi.org/10.1016/j.jaccedu.2017.06.001>
- Reiser, R. A. (1994). Clark's invitation to the dance: An instructional designer's response. *Educational Technology Research and Development*, 45–48.

- Richardson, C. T., & O'Shea, B. W. (2013). Assessing gender differences in response system questions for an introductory physics course. *American Journal of Physics*, 81(3), 231–236.
- Riding, R., & Rayner, S. (1998). *Cognitive styles and learning strategies: Understanding style differences in learning and behaviour*. D. Fulton Publishers.
- Roschelle, J., Dimitriadis, Y., & Hoppe, U. (2013). Classroom orchestration: Synthesis. *Computers & Education*, 69, 523–526.
- Schmidt, M. (2008). The Sankey Diagram in Energy and Material Flow Management. *Journal of Industrial Ecology*, 12(1), 82–94. <https://doi.org/10.1111/j.1530-9290.2008.00004.x>
- Schullery, N. M., Reck, R. F., & Schullery, S. E. (2011). Toward solving the high enrollment, low engagement dilemma: A case study in introductory business. *International Journal of Business, Humanities and Technology*, 1(2), 1–9.
- Shadiev, R., Hwang, W.-Y., Huang, Y.-M., & Liu, C.-J. (2016). Investigating applications of speech-to-text recognition technology for a face-to-face seminar to assist learning of non-native English-speaking participants. *Technology, Pedagogy and Education*, 25(1), 119–134.
- Sharples, M. (2013). Shared orchestration within and beyond the classroom. *Computers & Education*, 69, 504–506.
- Stoner, G., & Milner, M. (2010). Embedding generic employability skills in an accounting degree: Development and impediments. *Accounting Education: An International Journal*, 19(1–2), 123–138.
- Terry, N., Macy, A., Clark, R., & Sanders, G. (2015). The Impact of Lecture Capture on Student Performance in Business Courses. *Journal of College Teaching & Learning*, 12(1), 65–74.
- Tobin, T. J. (2018). Re-Framing UDL for Broader Adoption in Higher Education". *Learning Disabilities*, 21, 3–14.
- Wald, M., & Bain, K. (2008). Universal access to communication and learning: The role of automatic speech recognition. *Universal Access in the Information Society*, 6(4), 435–447.