

**Web Conferencing-Based Tutorials: Student Perceptions Thereof and the Effect on
Academic Performance in Accounting Education**

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ABSTRACT

This study explores undergraduate accounting students' perceptions of web conferencing-based tutorials, in a developing country, South Africa. In addition, this study explores the effect of these tutorials on academic performance. Understanding the perceptions of students regarding the effectiveness of using web conferencing is both influential and critical to the success or failure of the integration of web conferencing in accounting education. In general, attendance of web conference-based tutorials was found to positively and statistically significantly impact the students' academic performance, and the majority of the respondents agreed that regularly attending the web conferences and connecting with instructors improves their academic performance. These findings offer support for the continued use of web conferencing as a beneficial teaching and learning intervention. While this study is limited to a single site, the positive results of this study may encourage other instructors to explore web conferencing tutorials and enable subsequent multiple site investigations.

Keywords: *Web conference, academic performance, connectivism, tutorials, synchronous learning*

1. Introduction

The purpose of this study is to examine undergraduate accounting students' perceptions of web conferencing-based tutorials. In addition, this paper explores the effect of the web conferencing-based tutorials, on academic performance, as measured by students' performance in summative assessments. Web conferencing forms part of the new generation of Web 2.0 technologies. Web 2.0 represents the second stage of development of the World Wide Web, characterized by greater user interactivity and collaboration, more pervasive network connectivity and enhanced communication channels (O'Reilly & Battelle, 2004). Web 2.0 technologies have allowed instructors to adopt synchronous e-learning tools in their teaching (Wang & Hsu, 2008) including VoIP (Skype) (Pan & Sullivan, 2005), chat tools (Duemer et al., 2002), virtual classrooms (Branon & Essex, 2001; O'Flaherty & Laws, 2014) and web conferences or webinars¹ (Hotcomm, 2003; Kear, Chetwynd, Williams, & Donalan, 2012).

Web conferences, in particular, offer significant potential in terms of the collaborative elements of synchronous technologies, namely: the ability to give, receive and discuss information, and to generate new knowledge in a connectivist, real-time, two-way format (Marjanovic, 1999; Bell, 2003; Copley, 2007; Wang & Hsu, 2008; Giannakos & Vlamos, 2012). Web conferencing provides a close alternative to face-to-face learning that makes it easy and convenient for instructors and students to connect (Hotcomm, 2003; Wang & Hsu, 2008) without the need to travel (Barron et al., 2005; Britt, 2006; de Gara & Boora, 2006; Wang & Hsu, 2008; NYU, 2017;

¹ Webinar is short for **Web**-based **seminar**. A Webinar can be defined as a presentation, lecture, workshop or seminar that is conducted over the web using video conferencing software. Some other terms used for a webinar include: synchronous online environments (Hampel 2006) and web conferencing (Loch and Reushle 2008; Kear et al. 2012). In this paper we will use the term 'web conference'.

UCL, 2017). Web conferences can be employed by instructors for various pedagogical uses, including didactic knowledge dissemination, supplementing class materials and guest lecture presentations (Harris & Park, 2008). Further, it has been suggested that the use of web conferences prior to an assessment may decrease student anxiety before the assessment (Maag, 2006). Web conferences can also be recorded for students if they are unable to attend the real-time web conference, or for subsequent re-view of the web conference by attendees (Meyer, 2003; Wang & Hsu, 2008). Such re-view assists students in supplementing their knowledge and understanding (Evans, 2008), through rewinding and skipping through content (Dale & Pymm, 2009) and facilitates revision and review during exam preparation (Van Zanten, Somogyi, & Curro, 2012).

Despite these apparent benefits, it cannot be guaranteed that the use of web conferencing will enhance students' academic performance and there is currently little evidence-based enquiry into the effect of web conferencing on students' academic performance to support its adoption (Lim, Morris, & Kuptitz, 2006; Hunter, 2007; Tallent-Runnels et al., 2006; O'Flaherty & Laws, 2014). This investigation is therefore both timely and important for both instructors and students. Understanding the perceptions of students regarding the effectiveness of using web conferencing is both influential and critical to the success or failure of the integration of web conferencing in accounting education. Shedding light upon students' perceptions of the effectiveness of web conferencing will assist in ensuring that the apparent benefits of web conferencing implementation, in higher education settings, is congruent to better academic performance.

The following section provides a theoretical basis for the paper. Thereafter, background is provided as context to the study, before documenting the research method, the results and discussion thereof.

2. Connecting students, instructors and information online

Technology has altered teaching and learning by connecting students, instructors and information online (Engelbrecht, 2005; Liaw, Huang, & Chen, 2007), replacing, or extending, the physical classroom with a virtual classroom (Alexander, McKenzie, & Geissinger, 1998, Giannakos & Vlamos, 2013). For example, in 2015 Harvard University's business school introduced HBX Live as it sought to embrace web conferencing by creating a live, online replica of its campus classrooms to teach its business students when they disperse on global study trips, and to host virtual research presentations (HBX, 2017).

The use of technology to connect students, instructors and information does not change the applicability of the theories of learning in informing effective teaching and learning, whether in the classroom or online (Driscoll, 2000). Traditional learning theories, such as behaviorism, cognitivism and constructivism were proposed and developed before the advent of e-learning tools (Siemens, 2005). Connectivism, as alternate learning theory, attempts to conceptualise the process of learning through technology (Siemens, 2005) as a social process through which Web 2.0 technologies connect students, instructors and information (Loizzo & Ertmer, 2016). Learning occurs online through social collaborations and interactions between connected networked nodes (people, places, devices, information etc.).

Initially, technology enabled the connection between students and between instructors and students through asynchronous discussion tools (Jeong & Joung, 2007; Knowlton, 2005; Pena-Shaff, Altman, & Stephenson, 2005). Delayed time, asynchronous discussion tools (for example video recordings, blogs and e-mails) support online learning through, providing students the flexibility they need to manage their own study time. Video recordings provide students, who have missed a lecture, the opportunity to catch up, and those students who learn more slowly than their peers, the opportunity to revisit and review difficult concepts (Meyer, 2003; Chiu, Lee, & Yang, 2006; Tan, 2007; Wieling & Hofman, 2010). Blogs or emails add structured and delegated discussion to a student's learning (Johnson, 2006). However, being delayed time by nature, asynchronous tools lack immediate feedback (Gao & Lehman, 2003), and are characterised by minimal social presence (Stodel, Thompson, & MacDonald, 2006) or face-to-face interaction (Vonderwell, 2003). Consequently, some evidence of low levels of participation in asynchronous online learning environments exists, with students not allocating the time necessary for asynchronous learning activities (De Freitas, & Neumann, 2009; Skinner, 2009).

Web technologies have progressed significantly and may now be overcoming the challenges of asynchronous communication. Web 2.0 technologies allow synchronous online learning tools by connecting students, instructors and information in virtual classrooms facilitated by web conferencing (Wang & Hsu, 2008). While web conferencing is increasingly being adopted in higher education, this has in many instances not been to replace face-to-face interaction (Wang

& Woo, 2007) but to complement face-to-face interaction (Montgomery, 2010). This extension of the physical classroom could mitigate some concerns about the use of technology leading to an overdependence on computers, that could result in insufficient human contact between students and their instructor (Keller & Cernerud, 2002; Hamburg & Lindecke, 2003). In extending the classroom, the instructor could, depending on the needs of the students, schedule numerous web conferences at various times, connecting students with information tailored to assist them with particular academic problems identified in the physical classroom (Montgomery, 2010). There is, however, little evidence-based enquiry of the effect of web conferencing on students' academic performance (Lim et al., 2006; Hunter, 2007; Tallent-Runnels et al., 2006; O'Flaherty & Laws, 2014). This gives rise to research question 1:

RQ 1: What is the effect of web conferencing-based tutorials, on academic performance, as measured by students' performance in summative assessments?

3. Web conferencing in developing countries

Given that the internet transcends borders, some instructors in developing countries are mimicking the first world trends of using technology in their teaching, (Khan, Moon, Moon, & Rho, 2010; Shahid, 2005). However, the adoption of e-learning initiatives in developing countries poses particular challenges that have resulted in many of these initiatives not being effective (Borstoff & Lowe, 2007; Khan et al., 2010; Shahid, 2005; Sife, Lwoga, & Sanga, 2008). The widespread adoption and effectiveness of web conferencing in developing countries may, for example, be hampered by inadequate internet penetration, inadequate bandwidth speed or exorbitant data usage costs (Wang & Hsu, 2008). Internet penetration, expressed as the

number of internet users as a percentage of the total population, in South Africa (48%) for example, lags significantly behind developed countries such as Australia (85%), New Zealand (86%), the United Kingdom (92%) and the United States (87%) (World Bank, 2014). Further, many students may lack basic computer literacy skills necessary to effectively use web conferencing tools in higher education. In South Africa, the reason for the inadequate development of computer literacy skills may be in part ascribed to the State's secondary school funding model. South African secondary schools can raise funds, in addition to the state funding, through the collection of school fees from affluent parents and guardians (Coetzee, Schmulian, & Kotzé, 2014). Consequently, as a legacy of Apartheid, former White and Indian schools that were historically well resourced, generally continue to be better resourced through parent funding supplementing state funding, unlike the poorly resourced former African schools located in the less affluent areas (Sartorius & Sartorius, 2013; Spaul, 2013; Coetzee et al., 2014). The poorest African schools have an average of only 35 library books and 2 computers with no internet access, while the former White and Indian schools have on average in excess of 4,000 library books and 35 PC's with high speed broadband internet access (SACMEQ, 2011).

Against the background of South Africa as a developing country this study explores the following additional research question:

RQ 2: What are accounting students' perceptions of web conferencing-based tutorials in a developing country.

4. Research method

To explore students' perceptions of web conferencing-based tutorials and the effect of these tutorials on academic performance, this paper reports the result of a study of 449 non-repeating, undergraduate second-year accounting students. Formal classes are complemented by weekly web conferencing-based tutorials. Attendance of web conferences is not compulsory. During the web conference, topics dealt with in the formal face-to-face classes are briefly revised through didactic PowerPoint presentation or Excel-based demonstration, before allowing students to raise questions or request additional explanation through a text-based chat function. The text-based chat function allows students to connect and interact with the instructors online, thereby extending the physical classroom with a virtual classroom. It also provides the opportunity for students to connect with each other and to learn from each other, through the questions being asked and the responses given by either the instructor or their peers.

4.1 The effect of web conferencing-based tutorials on student learning

In response to Research Question 1, an exploratory ordinary least-squares (OLS) regression was used to simultaneously explore the effect of the students' attendance of web conferences, on the students' academic performance (AP), while controlling for other variables that may potentially influence academic performance namely, schooling background, previous academic performance, Thuthuka and Fasset. The student's average mark obtained over six summative assessments in the course were used as proxy for academic performance. No marks were awarded for attendance of the web conferences and as web conference attendance is voluntary, it

is submitted that it is unlikely that students would attend unless there was some form of perceived benefit.

The formula is as follows:

$$AP = \alpha + \beta_1 Web + \beta_2 HighSchool + \beta_3 PriorPerf + \beta_4 Thuthuka + \beta_5 Fasset + \varepsilon$$

4.2 Variable of interest

To explore the effect of attending web conferencing-based tutorials (*Web*) on academic performance (*AP*), actual attendance of the web conferences (*Web*) was determined with reference to electronic attendance registers provided by the web conferencing software. The variable for the attendance of a web conference ranged from '0' if the student did not attend any of the web conferences to '5' if the student attended all five of the web conferences during the semester. Only students who attended for longer than 30 minutes of each 50 minute web conference were included in the list as "attended".

4.3 Control variables

Educational opportunities for African students living in areas serving previously disadvantaged African schools, continue to be limited because of a perpetual shortage of teachers, poorly trained teachers, overcrowded classrooms, lack of funding and support programmes, weak parent-teacher bodies, little community support and limited, if any, access to computer and online resources (Van der Berg, 2008; Hammond et al., 2009; Jansen, 2011; Lam, Ardington, & Leibbrandt, 2011). However, the expanding African middle class in South Africa, and students from these families, are increasingly raised in former White suburbs and attending former White

and Indian schools offering a higher quality of education (Coetzee et al., 2014). The inclusion, therefore, of a control variable for a student's schooling environment may ensure greater classification refinement of students' learning opportunities.

South African public schools are classified by the State, based on the socio-economic level of the community in which the school is located. The classification is based on a score ranging from one to five, where a five rating (Quintile 5) indicates that the school is located in a more affluent socio-economic community, offering higher quality learning opportunities (historically White, Indian or Private schools) and a one rating (Quintile 1) indicating the poorest communities offering lower quality learning opportunities (historically African schools). *HighSchool* equals '1' if the student attended a quintile 5 school or '0' if the student attended quintiles 1 to 4 schools². The sign for the coefficient *HighSchool* is expected to be positive, as it is expected that students from quintile 5 schools, with greater access to computer and online resources, will have more advanced computer literacy skills to effectively use web conferencing tools in higher education.

In addition to the quality of education opportunities, a significant positive correlation between prior academic performance and subsequent academic performance has been widely reported (Clark & Sweeney, 1985; Ingram & Petersen, 1987; Eskew & Faley, 1988; Doran, Bouillon, & Smith, 1991; Gist, Goedde, & Ward, 1996; Murtaugh, Burns, & Shuster, 1999; Duff, 2004; French, Immekus, & Oakes, 2005; Graunke & Woosley, 2005; Johnson, 2008; Grace & Black,

² Quintiles 1 to 4 were combined as the individual groups were too small to allow for meaningful statistical analysis.

2011). Consequently, a control variable for the student's academic performance at the end of the student's prior academic year is included (*PriorPerf*). The proxy used for prior performance is the student's percentage mark for first year financial accounting. During the first year, students major only in financial accounting and they cannot progress to second year without the successful completion of this subject. The sign for the coefficient *PriorPerf* is expected to be positive.

Control variables were also included for students that receive additional academic assistance in the form of the mutually exclusive *Thuthuka* and *Fasset* special support programs. *Thuthuka* is a special support program for African students funded primarily by the South African Institute of Chartered Accountants (SAICA) in South Africa, which offers these students financial support as well as additional academic interventions (for more information, see Barac, 2015). The *Fasset* program is funded primarily by the state's Finance and Accounting Services Sector Education and Training Authority (Seta) (FASSET)³. *Fasset* makes funds available to qualifying African students for support that includes registration fees, textbooks, allowances and additional academic support. It is submitted that these support programs may influence academic performance (Barac, 2015). The variable for the *Thuthuka* program equals '1' if the student is enrolled in the *Thuthuka* program and '0' if not. The control variable for the *Fasset* program equals '1' if the student is enrolled in the *Fasset* program and '0' if not. The sign of the coefficients for both the *Thuthuka* and *Fasset* programs are expected to be positive.

³ Fasset is the Finance and Accounting Services Sector Education and Training Authority of South Africa established in terms of the Skills Development Act (Act 97 of 1998). The purpose of Fasset is to fund and encourage education and training of employees and future employees in the finance and accounting services sector to address the skills shortage in this sector of the South African economy.

4.4 Students' perceptions of a Web conferencing-based tutorial system

In exploring the students' perceptions of web conferencing-based tutorials (Research Question 2), a questionnaire was issued during the formal classes on campus, to ensure that all enrolled students are reached and not only those attending the web conferences. The questionnaire contained closed questions asking students to rate their perception of whether attending the web conference-based tutorials would improve academic performance on a range from "Strongly agree" to "Strongly disagree". Given the exploratory nature of this study, the remaining questions were framed as open-ended questions. The open ended questions were:

- 1. What do you believe are the main benefits of regular attendance of the **web conferencing-based tutorials**?*
- 2. If you missed any of the **web conferencing-based tutorials** during the module, what were your reasons?*
- 3. What, if anything, could the department or lecturers do to help improve your attendance of the **web conferencing-based tutorials** in this module?*
- 4. What, if anything, could you do to improve your attendance of the **web conferencing-based tutorials** in this module?*

5. Results and discussion

5.1 Demographic Profile of Student Respondents

South African university classes are characterised by significant population diversity (Coetzee et al., 2014; Fletcher, 1994; Pardo, 2004; Reynolds et al., 1982). South Africans are of many

ethnicities and speak any one or more of eleven official languages⁴, although the official business language of South Africa is English⁵. The respondent group (n=449) consisted mostly of 19 to 20 year old (n = 335), and there were more female (n=238) than male respondents (n=211). The majority of the students come from quintile 5 or private secondary schools (n=340, 76%). The students mostly (64%) used a laptop to access the web conferencing-based tutorials, while choosing to attend these web conferences from home (46%), student accommodation (32%) or on campus (22%).

5.2 The effect of web conferencing-based tutorials, on academic performance (RQ 1)

To explore the effect of web conferencing-based tutorials, on academic performance, an exploratory ordinary least-squares (OLS) regression was used to simultaneously explore the effect of the students' attendance of web conferences on academic performance, while controlling for other variables that may potentially influence students learning. The model fit is significant at the 1% level. No multicollinearity problems existed for the variables included. The regression results indicate that the coefficient for web conferences (*Web*) is positive and statistically significant (p=0.003) (Table 2). This suggests that, despite controlling for the effects of several other variables that may potentially impact academic performance, the attendance of

⁴ There are eleven official languages in South Africa: Afrikaans, English, Ndebele, Northern Sotho, Sotho, Swazi, Tsonga, Tswana, Venda, Xhosa and Zulu. Most South Africans can speak more than one of these official languages.

⁵ English is generally understood across the country, being the language of business, politics and the media, and is regarded as the country's lingua franca (bridge language/common language/trade language – a language that is used to make communication possible between people who do not share a native language.)

Table 1
Demographic Profile of Student Respondents

	African	White	Other	n	Total%
Gender					
Male	77	105	29	211	47%
Female	101	103	34	238	53%
	178	208	63	449	100%
Population group					
	39.6%	46.3%	14.1%	100%	
Instruction language					
Afrikaans	0	95	0	95	21%
English	178	113	63	354	79%
	178	208	63	449	100%
Age					
18	3	1	2	6	1%
19	54	76	26	156	35%
20	56	102	21	179	40%
21	46	24	10	80	18%
22 and above	19	5	4	28	6%
	178	208	63	449	100%
Socio-economic status of school					
Quintiles 1 to 4	58	5	2	65	14%
Quintile 5 and private schools	93	192	55	340	76%
No response	27	11	6	44	10%
	178	208	63	449	100%
Support course					
None	68	208	61	337	75%
Thuthuka	33	0	2	35	8%
Fasset	77	0	0	77	17%
	178	208	63	449	100%
Device used to attend the web conference					
Smart phone	10	10	3	23	5%
Tablet	12	25	15	52	11%
Laptop	100	175	38	313	64%
Desktop	63	26	9	98	20%
	185	236	65	486*	100%
Location from where the web conference was attended					
On campus	72	20	13	105	22%
Student accommodation	84	49	15	148	32%
Home	24	153	38	215	46%
Other	0	2	0	2	0%
	180	224	66	470*	100%

* = Total number is > 449 as respondents may have chosen more than one option.

Table 2
Regression

$AP = \alpha + \beta_1 Web + \beta_2 HighSchool + \beta_3 PriorPerf + \beta_4 Thuthuka + \beta_5 Fasset + \varepsilon$			
	Predicted Sign	Coef	t statistic
Constant		9.381	3.609
<i>Web</i>	+	1.375	3.039***
<i>HighSchool</i>	+	2.054	1.939*
<i>PriorPerf</i>	+	0.683	17.546***
<i>Thuthuka</i>	+	0.418	0.297
<i>Fasset</i>	+	1.087	1.026
Adjusted R ²			0.473
Std. error			6.973
<i>F</i> -value			68.8592 (p = 0.000)
<i>Significance, two-tailed:</i>		<i>Significance, one-tailed:</i>	
t > 2.575 = *** Significant at the 1% level		t > 2.327 = *** Significant at the 1% level	
t > 1.960 = ** Significant at the 5% level		t > 1.645 = ** Significant at the 5% level	
t > 1.645 = * Significant at the 10% level		t > 1.282 = * Significant at the 10% level	

web conferences positively impacts a student's academic performance, offering support for the continued use of web conferencing as a beneficial teaching and learning intervention. The coefficients for the control variables, *PriorPerf* ($p=0.000$) and *HighSchool* ($p=0.053$) are statistically significantly positive. No statistically significant differences for the control variables *Thuthuka* and *Fasset* are evident.

5.2 Students' perceptions of a web conferencing-based tutorial system (RQ 2)

The majority of the students ($n=305$, 68%) agreed or strongly agreed that regularly attending the web conference-based tutorials would approve a student's academic performance in general (Table 3).

To elicit further detail as to what students' perceptions of the apparent benefits of web conference attendance are, the following open-ended question was posed to the respondents and analysed using inductive logic to identify themes:

“What do you believe are the main benefits of regular attendance of the web conferencing-based tutorials ?”

Table 3
Regularly attending the web conferencing-based tutorials would improve a student's performance in general

	Number (n)	%
Strongly Agree	115	26%
Agree	190	42%
Neutral	123	27%
Disagree	13	3%
Strongly Disagree	4	1%
No response	4	1%
Total	449	100%

The responses to this question are summarized in Table 4. The social aspect of the web conference informed by connectivism (Siemens, 2005) and enabled by the synchronous Web 2.0 technology, connecting the students with the instructors in real-time, is evident in the student responses. Many students expressed the view that attendance of web conferences gives them the opportunity to ask questions and interact with the instructor (31% of responses) and also to learn from other students' questions (11.2% of responses). Anecdotally, in presenting the web conferences the authors, as instructors, have perceived greater interaction with the students in the web conference than in the classroom. The reason may be that students can ask questions in the relative anonymity of the online classroom environment which they do not feel as free to do in the physical classroom, especially given the size of the second year accounting class . It may also be due to the tutorial nature of the web conference. Additionally, the responses indicated some perception on the part of the students that learning had occurred through the web conferencing platform with comments being received that students were enabled to gain a better understanding of the topics and clarify difficult concepts (13.2% of responses).

Additionally, there is evidence that the web conferences did not forfeit the advantages of asynchronous environments as students feel able to re-visit and re-view difficult concepts (Meyer, 2003, Chiu et al., 2006, Tan, 2007, Wieling & Hofman, 2010). Many students also stated that attending the web conferences is a good source of revision (28% of responses). The convenience (2,5% of the responses) of the e-learning environment is also evident in the students' responses, but to a far lesser extent than the other advantages mentioned above.

Table 4
What do you believe are the main benefits of regular attendance of the web conferencing-based tutorials?

Theme	Number of responses
Students are able to ask questions and interact with the instructors	188
Source of revision	170
Get a better understanding of the topics and clarify difficult concepts	80
Opportunity to learn from other students' questions	68
Source of additional study material	36
Insight into exam technique	17
Convenience	15
Catch up on missed classes/keeping up to date	12
Identifies problem areas	8
Summarises the work	7
Work through question at a reasonable pace and in more detail	6

Despite the perceived benefits of attending the web conferencing-based tutorials, the web conference-based tutorials were not well attended. To provide some illumination as to possible reasons for this, the respondents were asked:

If you missed any of the web conferencing-based tutorials during the module what were your reasons?

The reasons provided, in general, appear to be more operational in nature than limitations on the students' learning as result of using the web conferencing platform. The principal reason given was clashes with other classes (40% of the responses) (Table 5). While every effort was made to schedule the web conference-based tutorial within the students' existing and already full time tables, the web conferences were not indicated on the formal university time table as no physical classroom needed to be booked to host the web conferences. As result, other subjects were not aware of the scheduling of the web conferences and clashes consequently may have arisen. The web-conferencing-based tutorials represent the White students' only tutorial option for the course but the majority of the African students (n=110, 62%) are part of the *Thuthuka* or *Fasset* support programmes, offering additional face-to-face tutorials and other support which makes scheduling in their timetables challenging.

Given that the course is situated in a developing country, the next most commonly cited reason was that the student did not have access to computer and/or the internet (18% of responses).

Table 5
If you missed any of the web conferencing-based tutorials during the module, what were your reasons?

Theme	Number of responses
Scheduling conflicts	216
Difficulty accessing a computer or the internet	99
Social commitments	76
Studied for another subject	75
Totally forgot	47
Used time to study on my own	16
Did not need additional assistance	7
Language barrier	3

However, despite being in a developing country, this result was somewhat surprising as the university has several venues, on campus or in the student accommodations, with internet connected computers that are freely accessible to the students, and these were used by 54% of respondents (Table 1).

In response to these challenges the students were asked:

What, if anything, could the department or lecturers do to help improve your attendance of the web conferencing-based tutorials in the module?

and

What, if anything, could you do to improve your attendance of the web conferencing-based tutorials in this module?

The most common response (64% of responses) aligning with the most common reason for non-attendance, was that the department should strive for a more convenient time for the web conferencing-based tutorials (Table 6) and that the students themselves should demonstrate better time management skills and plan their daily program better and set themselves reminders (22% of responses) (Table 7). The request that reminders be sent to the students (6%) was unexpected as the web conferencing software automatically sends out three scheduled reminders to all students that are registered for the web conference. Further, the software allows integration with many electronic calendars available to the students.

Table 6

What, if anything, could the department or lecturers do to help improve your attendance of the web conferencing-based tutorials in the module?

Theme	Number of responses
Improve scheduling	232
Send electronic reminders	21
Address more difficult questions with exam technique focus	19
Repeat on different days and times	15
Rather use face-to-face interaction	14
Improve internet access on campus	14
Increase number and frequency of web conferencing-based tutorials	12
Provide students with a lesson plan in preparation	12
Make attendance compulsory - Assign an attendance grade	10

Table 7

What, if anything, could you do to improve your attendance of the web conferencing-based tutorials in this module?

Theme	Number of responses
Better planning & time management	129
Setting diary reminders	65
Gain access to a computer or the internet	42
I have no other option (class clashes)	31
Prepare for the web conference	26
Attend the web conferences using the computer labs on campus	6

6. Conclusion

The purpose of this study was to explore undergraduate accounting students' perceptions of web conferencing-based tutorials. In addition, this study explored the effect of web conferencing-based tutorials on academic performance. Web conferences offer significant potential in terms of the collaborative elements of synchronous technologies, namely: the ability to give, receive and discuss information, and to generate new knowledge in a connectivist, real-time, two-way format (Giannakos & Vlamos, 2012). Web conferencing is therefore increasingly being adopted in higher education to complement face-to-face interaction (Montgomery, 2010) for example as additional tutorials. In exploring the students' perceptions of web conferencing-based tutorials, a questionnaire was administered. An exploratory ordinary least-squares (OLS) regression was used to simultaneously explore the effects of several variables, including the students' attendance of the web conferences on academic performance.

The results of the study suggest that the web conferences were not well attended and there appears to have been some operational challenges. Given the low internet penetration in South Africa, there were a number of students experiencing challenges in accessing an internet-enabled computer to attend the web conference, despite having access to the university IT infrastructure. The students, however, generally perceived the web conferencing-based tutorials to be beneficial to their academic performance, particularly for the connection and interaction with the

instructors. Web conference-based tutorials positively impacted the students' academic performance, and statistically significantly so, and offers support for the continued use of web conferencing as a beneficial teaching and learning intervention. Additionally, there was little evidence of the web conferencing hampering student learning due to the nature of the platform, as the students perceived only operational challenges.

Much has been written about instructors' resistance to technology adoption in higher education (Johnson et al. 2012). Consequently, many instructors are reluctant to extend their physical classrooms with web conferencing tutorials, particularly in a developing country with its additional infrastructure challenges. While this limits this study to a single site, this study provides evidence to support the use of web conferencing tutorials, which may encourage other instructors to explore web conferencing tutorials. Therefore, in time this study may be expanded to multiple sites. While this study adopted statistical control for additional factors influencing academic performance, an experimental study in which a control group is physically identified may offer further evidence in respect of the effect of web conferencing on academic performance. Replication of this study in other diverse education settings may enhance the generalizability of the results suggested in this study. Further research is also necessary to fully understand the complex issues that impact teaching and learning in web conference-based tutorials.

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