

2015-06-16

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Recommended Citation

Gavan, Edel (2015) "An Investigation of Student Participation in Synchronous Online Tutorials and the Impact of a Technical Support Resource," *Irish Journal of Academic Practice*: Vol. 4: Iss. 1, Article 8.
doi:10.21427/D76B0H
Available at: <https://arrow.tudublin.ie/ijap/vol4/iss1/8>

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An Investigation of Student Participation in Synchronous Online Tutorials and the Impact of a Technical Support resource

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Abstract

As schools, universities, retail stores and corporations flock to Online and eLearning, there are many compelling arguments to support their decision. Synchronous virtual classroom tools are used to support Online and eLearning interaction to mirror face-to-face learning. Martin (2012) identified that synchronous tools are a relatively new solution to supporting interaction in the virtual classroom. Ward *et al.* (2010) distinguished a strong, convincing body of literature which shows that synchronous online classrooms, enhanced by two-way audio, allow for real-time oral presentation, discourse, and checks for understanding among tutor and learners. Hrastinski (2008) determined the aural component of the synchronous virtual classroom as offering real time contact between teachers and students, mirroring face-to-face contact. Much of the research to date focuses on synchronous online resources and their link with participation while there is little or no research on the use of a resource to assist with technical issues inhibiting learners from participating. The aim of the study was to address this gap through means of an exploratory case study. The research included investigating, creating and assessing the usefulness of a resource to assist with technological issues impacting learners' ability to participate. The learners were students undertaking a post graduate qualification at Hibernia College. Data was collected through observations and surveys from 46 students and tutors. This research concluded that audio is particularly important for both knowledge construction and learning but also in creating a social atmosphere. While the technical support resource provided a useful aid to learners in this

study, further study will need to be conducted over a prolonged period to investigate the full extent of its usefulness. External factors do effect participation and poses a case for extending Moore's Theory of Transactional Distance to include external factors similar to Fallon's (2012) suggestion.

Keywords: Audio Participation, Dialogue, Learning Community, Online Learning, Synchronous Interaction, Transactional Distance, Virtual Classroom, Web Classes

Introduction

Synchronous virtual classroom tools are increasingly being used to support blended and fully online learning in higher education. The Sloan Consortium reported that over 6.7 million students took at least one online course in 2011 (Allen & Seaman, 2011). Sixty five percent of Higher Education institutions identify that online learning is a critical part of their long-term strategy and the rate of growth in online enrolments is ten times that of the rate in the overall Higher Education student population (Allen & Seaman, 2011). The Horizon Report indicates strong competition to the traditional models of Higher Education and the desire for institutions to provide a high quality of service and more learning opportunities. One of the major drivers for expansion in online learning is Adult Education, where learners are looking to continue their education in order to up-skill or retrain (McAfee, 2010).

While online learning has immense potential to reach new audiences, studies have shown that learners succeed in online courses when they are active participants (Verneil & Berge, 2000). Synchronous virtual classroom tools offer the answer to supporting interaction by means of a virtual classroom, in a cost effective method, for synchronous delivery in online courses (Martin, 2012). Hibernia College is Ireland's only government-accredited eLearning college, specialising in postgraduate, undergraduate and continuing professional development (CPD) programmes for learners and professionals across the globe. Synchronous online tutorials play a vital part in the learner experience at Hibernia College. The purpose of synchronous online tutorials within Hibernia College is to accompany the online lesson and provide an area where learners and tutor can interact as if in a normal classroom setting (Cahillane-McGovern, 2011).

This research looks to investigate the area of technical barriers to synchronous online learning and the link between technical barriers and learners' sense of distance (Moore, 1997). From the data collected, a resource (technical support resource) was created to assist with the technological issues impacting learners' ability to participate in synchronous online tutorials. While the research conducted concludes similar findings to other research in this field it goes further in offering a practical solution to addressing a reduction in the sense of distance.

Context

In a previous study by Hibernia College, it was found that learner engagement during synchronous tutorials varied widely depending on the experience and expertise of the tutor (Cahillane-McGovern, 2011). While this study explored learner engagement it did not, however, look at learner's perceptions of engagement or technical barriers to participation. Relatively little literature exists on instruction via synchronous online technologies that enable two-way audio interaction between tutor and students and this research looks to bridge this gap (Cunningham *et al.*, 2010). Feedback at Hibernia College indicated that students frequently encountered technical barriers, in particular microphones/headsets issues, and were unable to contribute verbally to the discussion in the virtual classroom thus impacting on learner input. While previous research suggests technical issues that impact this two-way audio, there is little or no research on the use of a resource to assist with common technical issues that inhibit learners from participating (Cunningham *et al.*, 2010). One aim of this paper is to address that gap. This research aims to contribute to current academic literature by creating and testing an intervention resource which aims to eliminate or reduce issues that have been identified by both my research and other research in this field (Cunningham *et al.*, 2010). This study also aims to explore the importance of audio in a learning and social sense.

Research questions guided the data collection for this study and a mixed method approach was used. The qualitative and quantitative data analysis involved identifying, coding and categorising patterns found in the data. Based on the survey results and literature, a technical support resource was created. Learners were asked to review this intervention and to identify its usefulness in assisting with technological concerns that impact learner's ability to participate. From this, a set of conclusions were drawn up and areas for future research identified. This paper reviews the literature, introduces the research, describes the learning intervention (resource) created and makes recommendations for future research.

Rationale for Synchronous Interaction in the Online Learning Community

Due to improvements in technology, including broadband and applications for online learning, synchronous online tutorials have increased in popularity (Chen *et al.*, 2005). Logistical, economic and instructional advantages also play a strong role in their growing popularity giving more flexible learning opportunities for learners - making geographical location less important and reducing the costs related to travel and time while still giving immediate interaction. Yamada (2009) identified four types of synchronous online learning:

1. Video conferencing (image and voice)
2. Audio conferencing (voice with no image)
3. Text chat (image with no voice)
4. Plain text chat (no image, no voice)

All or some of these elements are used to develop an online learning community. This research will focus on audio conferencing and plain text chat. Synchronous online learning operates in real time where both parties are present at the same time, (Hrastinski, 2008). This gives the learner immediate interaction that often mirrors a face-to-face learning environment (Steeple *et al.*, 2002). Dixson (2010) looks at the growing demand for online courses but

warns about the importance of engagement for effective online teaching. The real time interaction element of the synchronous online environment greatly reinforces a feeling of contact for the learner. Hrastinski (2008) also identified that the actual joining in and taking part in a dialogue is a very important level of participation in eLearning and the construction of knowledge. Yamada (2009) identified the idea of a real-time voice adding a dimension of closeness and contact between learners. There is a strong and convincing body of literature which shows that synchronous online classrooms enhanced by two-way audio allow for real-time oral presentation, discourse and checks for understanding among tutor and learners (Ward *et al.*, 2010).

What is Online Learner Participation?

Hrastinski's (2008) paper examined the area of participation and how it has been recorded in eLearning studies. He defines participation as "*a complex process comprising doing, communicating, thinking, feeling and belonging, both online and offline*" (Hrastinski, 2008, p.1761). While his study found that participation is a key element for both online and face-to-face learning, perceptions of what online participation actually was, varied. In his study, participation was categorised in six levels:

1. Accessing the eLearning environment
2. Writing messages
3. Quality of writing
4. Writing and reading
5. Actual and perceived writing
6. 6) Joining or taking part in a dialogue

The sixth element is the level that is being looked at in this paper - the actual joining in and taking part in a dialogue. The aural component offers real-time contact between teachers and

students, mirroring face-to-face contact (Hrastinski, 2008). In a study by Cunningham *et al.* (2010) the aural component was viewed as being obviously essential in modern teaching and learning.

Learners' Sense of Distance and the Importance of Quality in Dialogue

Synchronous online learning helps learners feel part of a community and allows questions and answers in real-time, thus demonstrating the importance of collaborative activities, group discussions and other forms of student-to-student interaction (Dixson, 2010). Fallon (2011) used Moore's well respected Theory of Transactional Distance (1997) framework to explore the impact on elements of learner autonomy and quality dialogue within a synchronous online learning environment. Fallon's (2011) study found that synchronous online classrooms can encourage dialogue; however, the quality of the dialogue is dependent on factors within the online classroom as well as other factors independent of the classroom. His paper suggests that, for certain learners, ability to engage in dialogue was affected due to technical and infrastructural influences such as broadband and computer equipment. Marjanovic (1999) discussed how the use of synchronous online systems led to improvements in active participation, quality of discussion and group dynamics.

Fallon's (2011) study found that participant engagement was effected by external factors and makes the argument that Moore's theory should be extended to include external factors. With increasingly complex technology Moore's theory fails to take into account external factors such as broadband, computer hardware and software.

Factors Impacting upon Quality of Dialogue and the Learners' Sense of Distance

Similarly to Fallon, McBrien & Jones (2009) used Moore's (1993) theory of transactional

distance to look at the sense of distance that the learner feels during the learning process. The notion of distance is a recurrent theme in distance learning and in particular with synchronous online learning (McBrien & Jones, 2009; Fallon, 2011; Kear *et al.*, 2012). Distance can be seen as the sense of contact that a learner feels regardless of geographical location. The learners' sense of distance has been seen to show strong links with learner interaction and engagement in the learning experience (Fallon, 2011). For distance learning to be successful, the sense of distance needs to be reduced (McBrien & Jones, 2009).

McBrien & Jones (2009) examined the sense of distance under three elements in the learning environment: dialogue, structure, and learner autonomy with dialogue referring to two-way communication and interaction (text or audio in this case). They stated that learners felt that dialogue was important to their teaching and learning, along with increasing participation. Structure referred to course organisation (synchronous online material in this case) and learner autonomy referred to independent learning and perceptions on participation. Under Moore's framework, McBrien & Jones' research found technical issues were a factor increasing the sense of distance under all three elements of the transactional distance theory.

Similarly to McBrien & Jones, Kear *et al.* (2012) looked at how synchronous online learning can reduce the sense of 'distance' learners feel. Kear's research demonstrates the importance of audio and its role in creating a social atmosphere, an important aspect in reducing the sense of distance. Due to audio playing a vital part in creating a social atmosphere, it is important that issues affecting audio interaction are kept to a minimum (Kear *et al.*, 2012). Their research found specific audio problems, and these included issues with stand-alone microphone and speakers, benefits of headsets, learners unable to get microphones to work

and audio either muffled or too low or lost half way through. They argue that these technical problems or lack of suitable equipment can prevent learners from using audio.

Further to the theory on distance, Sitzmann *et al.* (2010) applied the action regulation theory to technical difficulties. Their theory focuses on the notion that interruptions (technical in this case) work as an obstacle making it more difficult to pursue a goal (for example, listen to the tutor and respond). They recommend that information regarding common technical difficulties and how to overcome them should be provided to learners to reduce interruptions and breaks in focus. This information may provide learners with the skills to deal with technical difficulties and how to overcome them, suggesting that it may be beneficial for learners to view a brief training video before they access the environment (Sitzmann *et al.* 2010). They argue that this may limit cognitive load as well as a number of technical glitches the learner may encounter. Their research suggests that given that technical difficulties are inevitable in online training, research is needed to examine interventions that can be used to reduce the negative effects of these interruptions.

Similarly to this, Kwok Chi Ng (2007) looked at the importance of strengthening technical guidance/support in planning and e-moderating. The study demonstrated the importance of reminding learners to prepare and test systems before each class - a very simple and practical way of assisting with the learning experience (Kwok Chi Ng, 2007). McAlister, Ravenscroft & Scanlon (2004) also confirmed that synchronous online peer discussion, which included contextualization context, led to improved construction and collaborative knowledge.

Rationale for Construction of a Resource

Further to the literature discussed above, the additional papers below identify issues specific

to synchronous online tutorials. Much of the research to date focuses on synchronous online resources and their link with participation while there is little or no research on the use of a resource to assist with technical issues inhibiting learners from participating. The research discussed in this paper focuses on the cause and effect of interruptions; however, none of these take the further step of creating and testing an intervention. This paper aims to address this gap through means of an exploratory case study. Cunningham *et al.* (2010) indicated some major defects that limited learners in synchronous online tutorials. These included patchy connectivity, poor quality equipment inexpertly used and software issues. A paper by Martin (2012) looked at how technical difficulties could be minimized by a) training the learners ahead of time to use the applications; b) having students login ahead; c) providing a reference guide to address technical difficulties. A similar study by Walsh *et al.* (2012) at a Distance Education programme run by Dublin City University investigated how the use of synchronous online tutorials could enhance the teaching and learning experience. This study demonstrated that sound quality was an important technical issue.

Kwok Chi Ng (2007) looked at the importance of strengthening technical guidance/support in planning and e-moderating. His (2007) research found and identified the importance of reminding learners to prepare and test systems before each class - a very simple and practical way of assisting with the learning experience. Similarly to this, Sitzmann *et al.* (2010) applied the action regulation theory to technical difficulties suggesting that information regarding common technical difficulties, and how to overcome them, should be provided to learners. Martin (2012) also looked at some possible solutions to avoid audio issues, such as:

1. Use an ethernet (network) connection always
2. Avoid using a wireless connection

3. Advising learners not to run too many other applications when they are logged into the virtual classroom

There is a vast body of literature to suggest these issues cause interruptions and these interruptions have consequences on learning (Martin, 2012; Sitzmann *et al.*, 2010; Kwok Chi Ng, 2007; Cunningham *et al.*, 2010). Based on the current literature, data was collected to verify if the issues discussed also applied to Hibernia College and from there an intervention was created.

Research Questions

1. What technological issues impact learners' ability to participate in synchronous online tutorials?
2. What are the perceptions around learner participation in synchronous online tutorials?
3. Do learners see audio as a vital component for online tutorials and as more important than text participation?
4. Is a resource useful to assist with technological issues impacting learners' ability to participate in synchronous online tutorials?

These questions were used as the basis for developing the data collection tools and also formed the basis for the generation of the coding themes. This study examined data from three vantage points.

Methodology

An explanatory case study approach was used to answer the research question. Explanatory case studies deal with questions such as "how" or "why" and often use histories and experiments as the preferred research method (Yin, 2009, p.9). Case study strategies are often

"used to enlighten those situations in which the intervention being evaluated has no clear single set of outcomes" (Yin, 2009, p.20). Case studies are particularly suited as preliminaries to major investigations by providing "a source of hypothesis for future research" (Burns, 1997, p.365). All organisations have common and unique features, as is the case with Hibernia College. A case study gives the opportunity for one aspect of a problem to be studied (Bell, 2010). Yin (2009) discusses how examination-building is used to analyse the case study by building an explanation about the case. He also looks at how a descriptive approach may help to identify the appropriate casual links to be analysed, indicating how the goal is not to conclude a study but to develop ideas for further study (Yin, 2009). The following research questions guided the data collection for this study.

Data Collection Methods

1. Observations regarding the types and frequency of technical issues.
2. Learner perceptions regarding the types of technical difficulties, frequency and perceptions on audio participation.
3. Tutor perceptions regarding the types of technical difficulties, frequency and perceptions on audio.

A mixed method approach was used to address the research question. For the perceptions survey, a structured questionnaire was used which included an opportunity for open comments. Qualitative and quantitative data analysis involved identifying, coding, and categorizing patterns found in the data.

Background of Data Sample

The explanatory case study undertaken was conducted at Hibernia College, Ireland's only government-accredited eLearning college. The data was collected from The Professional

Diploma in Education Programme and The Higher Diploma in Arts in Primary Education Programme, both blended programmes which take place over two academic years.

Approximately 45% of both programmes are delivered online with the remainder delivered through onsite lectures, school observations and professional practice. The online component of the programme consists of on-demand online lectures (asynchronous resources), self-study (which should take approximately twelve hours per week) and online tutorials (synchronous resources) which should take approximately two hours per week.

Sample Size

Observational Data

Observational data was collected from three groups of learner. Group A had seven learners; Group B had six learners; Group C had six learners. The observational data was taken over a period of three, 60 minute, online classes for each of the groups. In total, nineteen learners were observed.

Learners' Survey

The same nineteen learners that were observed were given an online survey. Eight of these learners completed the online questionnaire.

Tutors' Survey

Ten tutors were given an online survey, different to that given to learners. Nine of the tutors responded. These were tutors facilitating the above groups of learners. These surveys were used to look at how technological issues impact learners' ability to participate.

Technical Support Resource Aid Survey

94 learners were given the technical support resource and asked to review it under a set of criteria, of those, seventeen responded. New learners embarking on a new programme were chosen.

Resource Design

While Hibernia College provides training on the synchronous online systems ahead of time, issues still arise frequently. Links and PDF documents are available with reference guides to some technical issues; however, there is no concise resource that targets the most frequent technical difficulties. Hibernia College felt there was a need to provide a brief, user-friendly and easily updated resource that is backed by in-house research and literature to identify learners needs. Observational data was collected from three groups of learners, a sample of nineteen learners. 86% of learners felt that technical issues inhibited them from contribution to an online tutorial in the past year. 73% of tutors felt that technical issues had some impact on the level of participation in online tutorials. 100% of learners felt that they would benefit from a training video with 71% believing that reducing the negative impact of technology was vital. 86% of learners felt more involved with audio while 100% of tutors felt that audio was more important than text only. Based on the survey results and literature, a technical support resource was created.

Overview of the Resource: Online Tutorial Technical Support Guide

The *Online Tutorial Technical Support Guide* was created offering general advice and tips to help with common technical issues in online tutorials. The resource was created to help learners to participate more fully in online tutorials. The resource can be used to either prepare new learners for a first tutorial or to help more experienced users to troubleshoot technical problems.

The Learning Outcomes

1. Understand and troubleshoot headset and internet connection issues, two of the most common problems encountered by learners.

2. Learn about particular AT&T software issues and quick fixes.
3. Learn about different technical terminology, operating systems and some basic PC maintenance.
4. Have a better understanding of technical issues and when to contact technical support.

The resource included elements of behaviourism, involving 'how to' learning elements and a step-by-step approach with predictable learning outcomes. The material which included video and screen casts of problem-solving, focusing on behaviour modification, was collated in the format of an articulate presentation. Cognitive approach elements of the resource focused on not overloading short-term memory by presenting too much material at once. This was achieved by chunking material into groups or categories to aid retention. The learners are given the opportunity to revisit topics to strengthen retention with an on-demand resource (Gayne, 1996). Learners have the opportunity to skip through modules, choose what is important and can immediately put their new knowledge to use. The resource was designed with the adult learner in mind: independent, self-directed, life-experienced, problem-centred, internally motivated, immediate application (Merriam, 2001). Mayer's (2009) multimedia design, describing twelve design principles were also considered, based on reducing extraneous processes, managing essential processing and fostering generative processing.

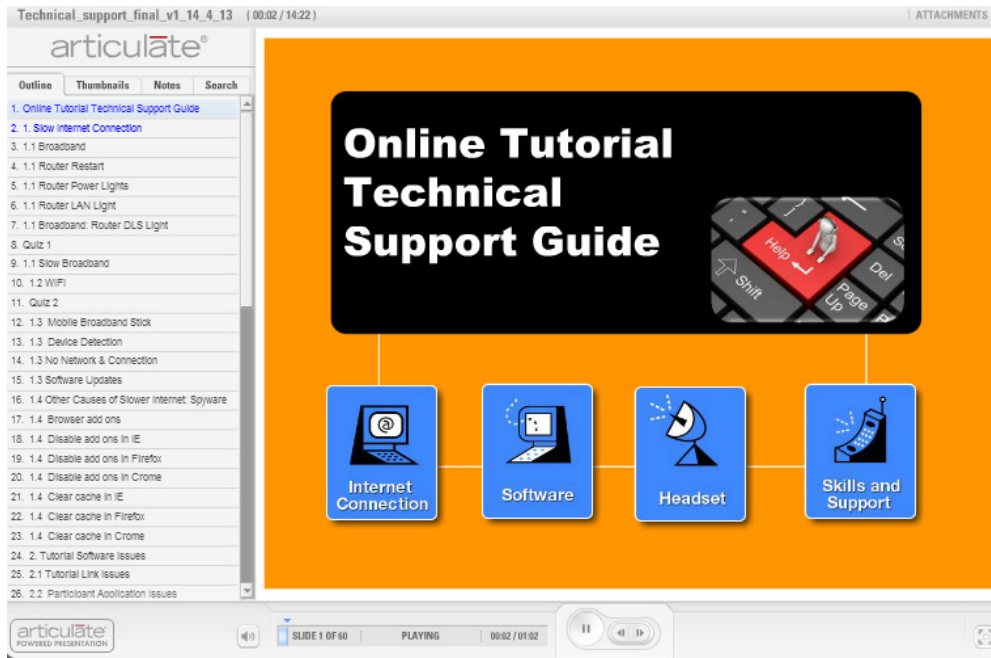


Figure 1 Illustration of the Start Page of the Resource

The following issues were identified in the data collection as shown in Table 1.

Data Collection	Microphone	Internet	Other
Observation	26% microphone	11% internet connection	n/a
Learners Survey	29% microphone	57% internet connection	14% logging onto AT&T
Tutors Survey	87.5% microphone	n/a	12.5% speaker issues

Table 1 Technical Issues Observed/Reported

Internet Connection

Cunningham *et al.* (2010) demonstrated some major defects that limited learners in synchronous online tutorials. Martin (2012) made some recommendations to help with technical issues including, the use an Ethernet (network) connection always and to avoid using a wireless network. These included patchy connectivity, poor quality equipment inexpertly used and software issues. In data collected 11% of learners had internet connection

while in the Learners Survey 57% of learners had internet connection. Based on the research and literature, internet connection was identified as a major issue. The resource looks at a few common issues that could be slowing down internet connection, various types of internet connections and solutions associated with each.

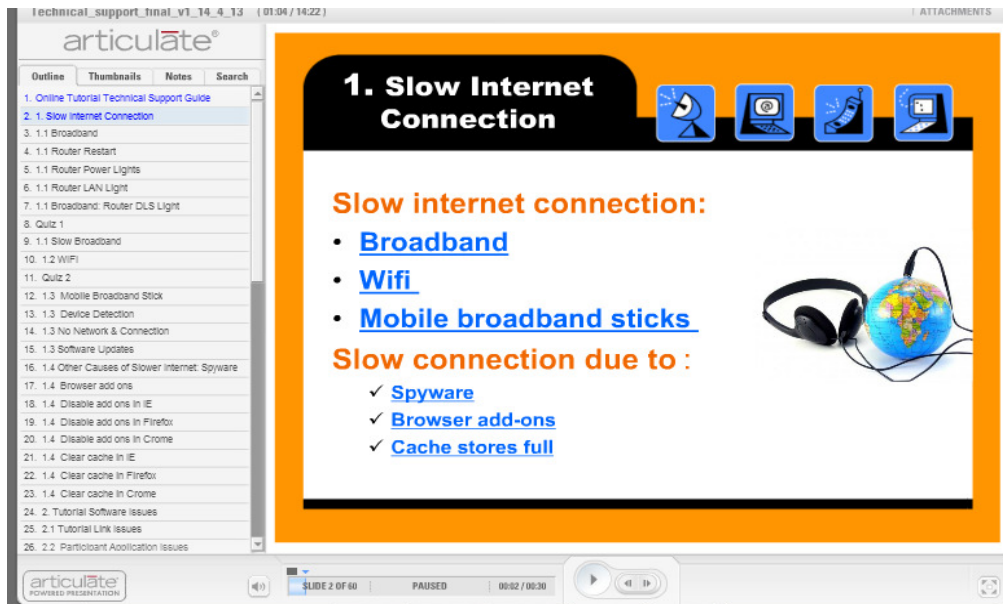


Figure 2 Illustration of section 1 - Internet Connection

Software

The study by Cunningham *et al.* (2010) found poor quality equipment inexpertly used and software issues were some of the major defects that limited learners in synchronous online tutorials. In data collected from the Learner Survey 14% of learners had software issues (AT&T, the software).

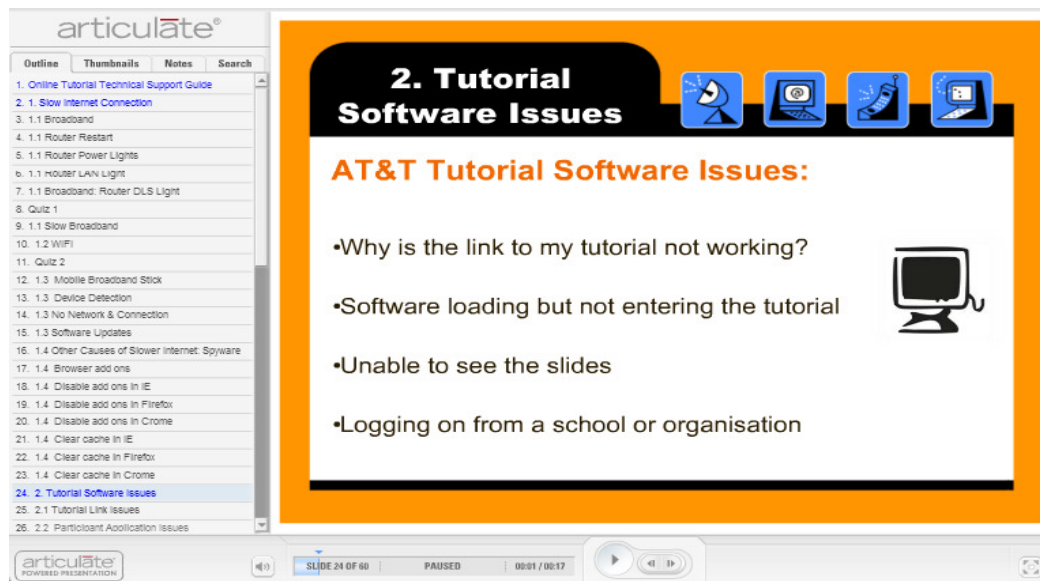


Figure 3 Illustration of section 2 - Software Issues

Headset

This section looks at the different types of headsets, common problems with each type, how to adjust the audio settings and how to do a microphone test. The study by Walsh *et al.* (2012) concluded that sound quality was an important technical issue. Indeed the research by Kear *et al.* (2012) found specific audio problems including: issues with stand-alone microphone and speakers; the benefits of headsets; learners unable to get microphones to work; audio muffled, too low or lost half-way through. Audio was seen as important in its role of creating a social atmosphere throughout the literature and as an important aspect in reducing the sense of distance. (Kear *et al.*, 2012; McBrien & Jones, 2009). The data collected reveals microphone issues ranking highest with 26% for Learners Observed, 29% for Learners Surveyed and 87.5% of Tutors Surveyed all reporting difficulties in this area.

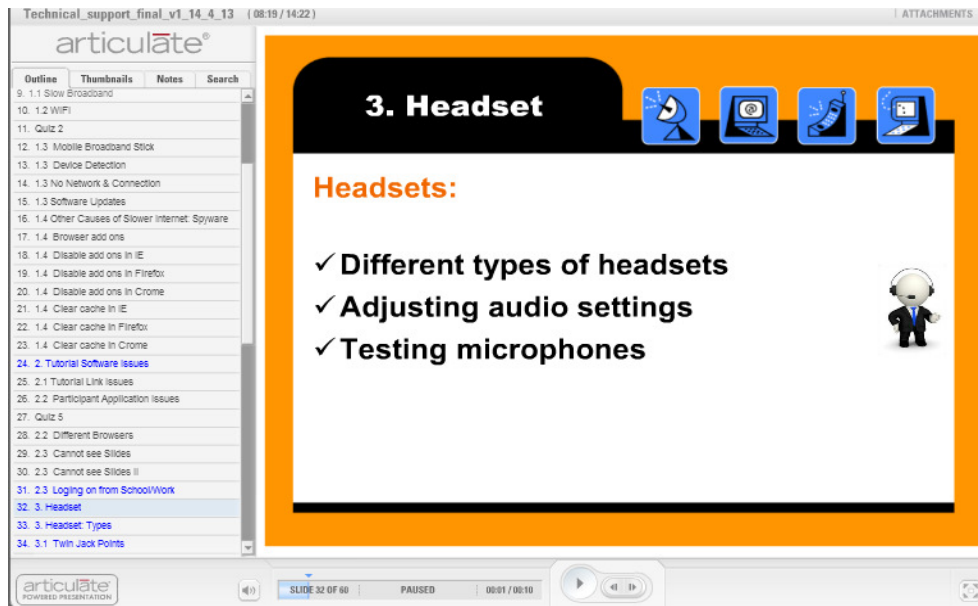


Figure 4 Illustration of section 3 - Headset

Support and Skills

Martin's (2012) research identified how technical difficulties could be minimised by a) training the learners ahead of time to use the applications; b) having students login ahead and c) providing a reference guide to address technical difficulties. In the emerging data of this research, some tutors commented on the varying level of digital literacy. Tutors quote: "*We presume that learners are very competent on computers but this is often not the case.*" (Data collected by Hibernia College from completed tutor survey on the Higher Diploma in Arts in Primary Education, 2013). This section looks at how to get technical support, offers some help with technical terminology, PC maintenance and some helpful videos and tips - aiming to assist with some digital literacy as a prerequisite for self-help technical support.

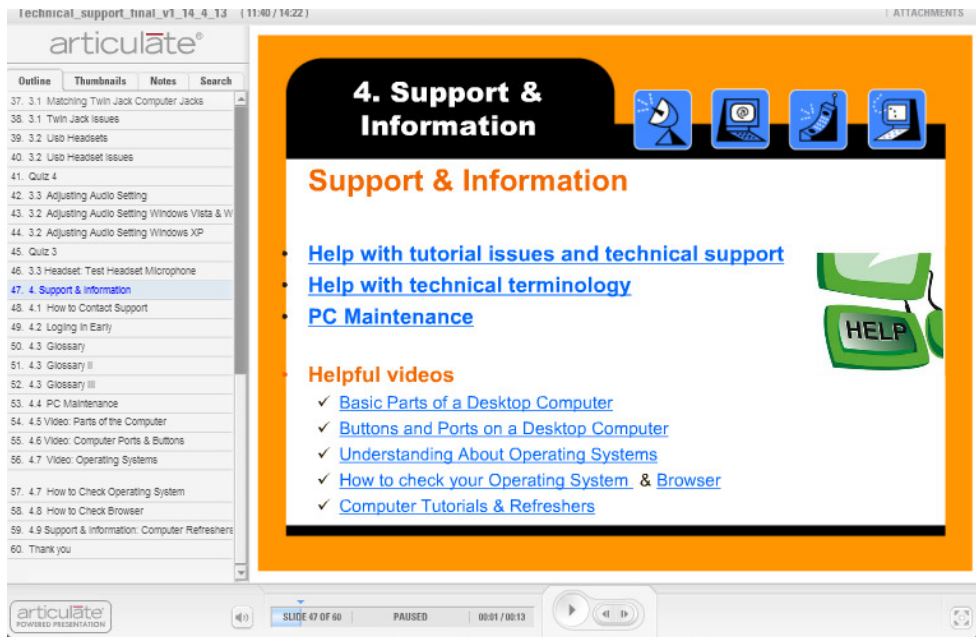


Figure 5 Illustration of section 4 - Support and Information

Preliminary Data Analysis and Findings

Varying sources of information were used in order to increase the validity of the study and approach the research question from multiple perspectives. Using many sources of data as evidence in case studies provides "converging lines of inquiry" which is a process of data triangulation (Yin, 2009). Data was collected from:

- Observations of online tutorials
- Learners online surveys
- Tutors online surveys

The qualitative component of this study addressed learners' perceptions around how important they felt participation was.

Factors Impacting upon Participation and Dialogue in Synchronous Interaction

86% of learners felt that technical issues inhibited them from contributing to an online tutorial in the past year (Data collected by Hibernia College from completed tutor survey on

the Higher Diploma in Arts in Primary Education, 2013). While, 73% of tutors felt that technical issues had some impact on the level of participation in online tutorials (Data collected by Hibernia College from completed tutor survey on the Higher Diploma in Arts in Primary Education, 2013).

Importance of Quality in Dialogue

Data Collection	Participation	Perceptions
Learners Survey	100% Rated Participation as important	94% link between the participator learning
Learners Survey	59% important all can use audio	86% felt more involved with audio
Tutors Survey	100% Rated Participation as important	83% felt learners used technology as an excuse
Tutors Survey	100% audio more important than text-only	

Table 2 *Perceptions around Learner Participation*

Learners Survey: Learner perceptions regarding the types of technical difficulties, frequency and perceptions on audio participation.

Tutors Survey: Tutor perceptions regarding the types of technical difficulties, frequency and perceptions on audio.

Strategies Employed to Address Issues

Based on the data collected above, a technical support resource aid was created. This is discussed in more detail in the discussion and recommendations section.

Data Collection	Opinions on the guide:
Learners Survey	77%: Felt the guide better prepared them for synchronous online tutorials 88%: Thought other learners doing synchronous online tutorials would find this guide useful 100%: Felt they would refer to this guide if they have technical issues 100%: Felt the resource clear and understandable

Table 3 Opinions on the Guide

Learners' survey: Learner perceptions regarding the types of technical difficulties, frequency and perceptions on audio participation.

Limitations

While the sample size of this research was limited, the findings may assist others working in this field to identify similar problems and possible solutions (Bell, 2010). This study only looked at two groups of learners in one organisation. Who is to say that this group is typical of other groups (Bell, 2010)? A recognised limitation of case study research is the bias of the researcher. To counteract this, as a researcher, I was open to contrary findings (Yin, 2009). Learners have varying technical skills, thus, the data should only be used on a case study basis. There is also the possibility that learners may not wish to contribute or not be prepared for their online tutorial and may say their microphone is not working, 'technology as an excuse' (Regan *et al.*, 2012). There are always issues with technology and 100% of the issues cannot be resolved.

Discussion

Within the discussion section, each of the research questions is reviewed in relation to the findings from the data, and the relevant literature reviewed.

What technological issues impact learners' ability to participate in synchronous online tutorials?

Nineteen learners were observed, and eight of these learners completed the online questionnaire. The observational data in this research showed that 26% of the nineteen learners surveyed had microphone issues. 86% of learners felt that technical issues inhibited them from contributing to an online tutorial in the past year. This relates to other work in this area conducted by Kear *et al.* (2012), where inability to get microphones to work prevented learners from using audio. Similarly, Cunningham *et al.* (2010) identified patchy connectivity, poor quality equipment and software issues as being inhibiting technical factors. 73% of the nine tutors surveyed felt that technical issues had some impact on the level of learner participation in online tutorials. This relates to the findings of Fallon's (2011) exploration of Moore's Theory of Transactional Distance (1997), which stresses that the quality of dialogue is dependent on factors within the online classroom as well as other factors independent of the classroom. Fallon's (2001) literature is similar to the finding of this research in Hibernia College which confirms external issues have a strong impact on the ability to engage in dialogue in online tutorials.

One tutor commented:

"The big problem I have in most tutorials is that the learner's microphones do not work. I don't know why. It means that you have to rely on a few learners to do the talking. It is worse on some modules than on others."

(Data collected by Hibernia College from completed tutor survey on the Higher Diploma in Arts in Primary Education, 2013).

What are the perceptions around learner participation in synchronous online tutorials?

A part of this study looked to investigate perceptions around learners' ability to participate in synchronous online tutorials. In the technical support resource survey, learners were asked their opinion on participation and the link between audio participation and learning. All eight

learners surveyed thought participation was important. 62.5% considered it important, and 37.5% considered it very important. 94% of the eight learners felt that there was a link between the participation in synchronous online tutorials and learning. Both learners and tutors in this study felt that audio participation in online tutorials is hugely important. The work of both Finkelstein (2006) and Dixson (2010) emphasises the importance of socialisation, information exchange and engagement in effective online teaching. Similarly, Hrastinski's (2008) research concluded that joining in and taking part is a way that learners can construct knowledge that contributes towards learning.

Tutors were asked the same question with 100% of the nine tutors surveyed indicating that participation was important, varying from critical, very important or important. Certain tutors felt that a microphone not working was a "*big problem*", which only left a few learners to participate. This relates to other work in this subject area, such as findings by Kear *et al.* (2012), which demonstrate the importance of audio and its role in creating a social atmosphere, an important aspect in reducing the sense of distance.

Do learners see audio as a vital component for online tutorials and more important than text participation?

Learner surveys were then used to identify if learners consider audio a vital component for synchronous online learning. 59% of learners surveyed feel it is important that everyone is able to use audio. 86% of 19 learners agreed that they feel more involved as part of the group when they can use audio chat. 57% strongly agreed and 29 % agreed. All nine tutor surveys indicated that verbal participation is more important than text-only communication. As previously discussed in the literature review section, both Kear (2012) and Yamada (2009) identified text chat as contributing very little to the synchronous online learning environment

and real time voice added a dimension of closeness and contact. Cunningham *et al.* (2010) felt that the aural component was essential. Similarly to this, McBrien & Jones (2009) and Kear *et al.* (2012) identified how synchronous online learning can reduce the sense of distance that learners feel.

Is a resource useful to assist with technological issues impacting learners' ability to participate in synchronous online tutorials?

Tutors and learners were also asked for their opinions on how technical guidance could be improved. 72% of the nine tutors surveyed felt that strengthening the provision of technical guidance for online tutorials, by providing an additional resource, could enhance the learner experience. All eight learners surveyed felt that providing a brief training video on common technical issues encountered in online tutorials would reduce the negative impact of technical issues. Sitzmann *et al.* (2010), Martin (2012) and Kwok Chi Ng (2007) state that information regarding common technical difficulties, and how to overcome them should be provided to learners.

One tutor stated that:

“It is difficult to say what could be in the resource but a simple guide to using microphones and speakers and what to do when things go wrong would be helpful and could be used by learners and tutors alike. We presume that learners are very competent on computers but this is often not the case.”

(Data collected by Hibernia College from completed tutor survey on the Higher Diploma in Arts in Primary Education, 2013).

Usefulness of a Resource

Learners were asked to review the *Online Tutorial Technical Support Guide* and to identify its usefulness in assisting with technological issues that impact learners' ability to participate. The general feedback was positive, with 77% of nineteen learners feeling that the guide has better prepared them for the synchronous online tutorials. Most felt that the guide would be of

use to other learners doing synchronous online tutorials (88%). All the learners felt that they would refer to this guide if they have technical issues and felt the guide was clear and understandable. This supports the views of Sitzmann *et al.* (2010), Martin (2012) and Kwok Chi Ng (2007) that information on how to overcome technical difficulties should be provided to learners. As discussed in the literature review, the findings from Sitzmann *et al.* (2010) indicate that given that technical difficulties are inevitable in online training, research is needed to examine interventions that can be used to reduce the negative effects of these interruptions.

Conclusion and Recommendation

Synchronous virtual classroom tools are a relatively new solution to supporting interaction in the virtual classroom (Martin, 2012). Relatively little literature exists on instruction via synchronous online technologies that enable two-way audio interaction between tutor and students and this research looks to bridge this gap (Cunningham *et al.*, 2010). While previous research indicated technical issues that impact this two-way audio, there is little or no research on the use of a resource to assist with common technical issues that inhibit learners from participating. This research aims to address this deficiency. While the research conducted concludes similar findings to other research in this subject area it goes further in offering a practical solution to addressing a reduction in the sense of 'distance'. The Horizon Report (2013) suggests the need to not only capitalise on new technology but also to use the tools and services to engage learners on a deeper level. Net-based teaching carries with it a set of constraints and a set of possibilities (Cunningham *at al.*, 2010) and this research aims to address some of these constraints. This paper, undertook research, found, identified and concluded that a resource can assist with technical issues impacting learners' ability to

participate in synchronous online tutorials.

1) External factors do effect participation. There is a strong case for extending Moore's Theory of Transactional Distance to include external factors, as per Fallon's (2012) suggestion. Audio is of significant importance in synchronous online learning, not only for knowledge construction and learning but also for its role in creating a social atmosphere, similar to the finding of Kear (2012), Yamada (2009) and McBrien & Jones (2009).

2) Hardware issues do exist in Hibernia College with past surveys failing to demonstrate this. Learners may not recognise microphones/headsets as hardware thus the IT support surveys may not be a true reflection on the learners' perspective of technical issues.

3) The technical support resource provided a useful aid to new learners by pre-empting technical issues and providing guidance on technical issues effecting participation. A further study will need to take place over a prolonged period. The guide will also to be made available through different mediums such as on the college wiki.

4) Learners log-on time can greatly assist with the time available to resolve issues and to pre-empt possible solutions. A paper by Martin (2012) also makes this recommendation.

5) The area of digital literacy is something that the resource touched upon and was highlighted by feedback from the tutor survey. Digital literacy in the context on online tutorials is an area that could require further study.

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