Student perceptions of audio feedback in a design-based module for distance education

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ABSTRACT: Within higher education, student perceptions are beneficial in evaluating the nature and quality of educational interventions. One such intervention involves the use of academic audio feedback on the submitted assignments of distance learning students. This type of feedback may well enhance the educational experience of the students, irrelevant of how it is produced. The purpose of this article is to highlight the perceptions of students regarding audio feedback, which was provided in a design-based module offered at an open distance learning institute in South Africa. For this research, a case study was used were quantitative and qualitative data were collected from 30 students enrolled for a module termed, Design Project III, during 2017. A few key advantages that were highlighted include a good learning experience, better time utilisation, informative and better communication. A key disadvantage relates to a lack of on-campus WiFi connectivity or availability. However, it is recommended that this intervention (providing audio feedback to students) be adopted by more academics at open distance learning institutions as they strive to improve student engagement with the study leader and with the course content.

Keywords: Design-based learning, project-based learning, WhatsApp

INTRODUCTION

At the same time, one of the things I noticed was that the moment there was any kind of audio attached to virtual reality, it really improved the experience, even though the audio didn't feel like a sound engineer or composer had been anywhere near it [1]. These words, by Thomas Dolby, an English musician, conveys the idea that the addition of audio enhances a virtual reality experience, irrelevant of how the audio is processed. This is also true in the case of engineering education, where students tend to be auditory, visual or kinesthetic learners.

Auditory learners learn best by hearing, instead of reading through a lot of text. In fact, it has been noted that, in general, South African students are not meeting the reading and writing levels that their peers in other parts of Africa are reaching, even in other less well-resourced countries [2]. On the other hand, simply listening to a classroom lecture does not necessarily imply that learning has occurred, as this may be equated to passive learning. Therefore, the context of using audio in engineering education needs to be contextualised, if its benefits are to be realised. In this study, it is used as a means of conveying academic feedback on student assessments.

Academic feedback is paramount to student success [3], as it points students to ways in which they can improve their learning [4], while allowing one to compare the outcome achieved by a student with the desired outcome [5]. When it comes to academic feedback on assignments, then auditory feedback merits consideration in contrast to textual feedback. This type of feedback may well enhance the educational experience of the students, irrelevant of how it is produced. The purpose of this article is to highlight the perceptions of open distance learning (ODL) students regarding the audio feedback, which they received on their course assignments. The article starts with a review of published literature regarding the importance of student perceptions and of audio feedback in education. The context of the study is then detailed, along with the research methodology. Results and discussions are presented simultaneously, followed by succinct conclusions.

BENEFITS OF STUDENT PERCEPTIONS AND AUDIO FEEDBACK

Student perceptions have been used in evaluating service courses in engineering [6], in evaluating the use of open-book examinations in engineering [7] and in evaluating e-learning tools for engineering [8]. Within higher education, student perceptions are beneficial in measuring effective instruction [9] and in evaluating the nature and quality of educational

interventions [10]. Student perceptions are often considered in determining whether student academic satisfaction exists with regard to the quality of engineering education being offered [11]. If a specific intervention leads to student satisfaction in an engineering module, then it is more likely that the student will be motivated to complete that module. This in turn may lead to academic success, which benefits both the student and the institution.

Disadvantages to student perceptions also exist. It can be a costly exercise [12], be influenced by expected or actual grades [13], by academic likeability [14], and by course workload and difficulty [15]. Furthermore, there are aspects of teaching that students simply cannot judge, such as the relevance of material to industry and the academics' preparation efforts [14]. Despite these disadvantages, obtaining student perceptions still remains one of the many indicators that may be used to determine if good teaching exists. Besides, if the voices of students are constantly ignored, could this not lead to dehumanisation and marginalisation? This cannot be allowed in a changing educational landscape, where higher education students are demanding that their voices be heard in transforming education.

Audio feedback has a number of advantages. It has been associated with higher levels of student engagement with learning [16] and is more personalised than textual feedback contributing to a greater sense of *social presence* and *teacher immediacy* [17]. This may further be linked to promoting the emotional engagement of students and personal connection between students and academics [18], while aiding students in terms of assignment revisions as they may listen to the audio recording repeatedly. Audio feedback is typically more detailed than textual feedback [19] and is generally considered to be quicker to provide. Studies further indicate that asynchronous academic audio feedback has been positively received by students and that they prefer it to textual feedback [20]. These advantages prove significant in higher education, where a current drive exists to improve student pass rates and graduate attributes. However, there are some deterrents or disadvantages, of audio feedback.

Recording the message and posting it on a learning management system may take more time than incorporating textual feedback directly onto the written assignment. Audio feedback would also require more bandwidth than using text alone [21]. Fortunately, the advent of smartphones and the advancement of technology has really simplified the process. Academics can easily provide (and post) a short personal audio message regarding an assignment using WhatsApp, while students can easily accept that audio message, wherever they have Internet connectivity. It is often observed that students walk to university with earphones attached to their ears, as they listen to their favourite music or radio station. May they not also be listening to academic audio feedback? This can surely occur more and more in the future, as more academics make use of audio feedback. This would though require that a WhatsApp group be formed, where students and academics can interact on a personal level.

STUDY CONTEXT

The School of Engineering at the University of South Africa (UNISA) consists of three departments; namely, Civil and Chemical Engineering, Mechanical and Industrial Engineering, and Electrical and Mining Engineering [22]. The last department offers diplomas and degrees in electrical engineering and mining engineering (BTech degree and National Diploma). Both qualifications have a number of compulsory modules in their curriculum, which students need to complete.

One of these modules, that feature design-based learning, is termed Design Project III. Due to the large number of student enrolments and the limited number of full-time academic staff members, UNISA assigns external study leaders to assist and guide students in this module. Study leaders are assigned to specific students, if the proposed project falls within the field discipline of the study leader. The study leader guides the students during the year of study and evaluates their work. The guidance helps students to structure an appropriate project that meets the learning outcomes of the module. Furthermore, the study leader provides structural and technical support to the students in terms of their reports.

The module is a continuous evaluation module where every grade contributes to the final grade of the student. The year grade contributes 20% to the final grade (Table 1 gives an indication of how the year grade is derived). The aim of the project proposal is for the student to indicate the field of study and for the lecturer to assign the student to an appropriate external study leader. In the first progress report, the student will not only provide more detail on the specific project, but also indicate which part of the project is to be designed. In the second progress report, the student will provide a detailed block diagram of the hardware, as well as a detailed flow diagram of the software required in the project. The aim of the third progress report is for the student to show that the project is working on a breadboard and to provide a complete schematic diagram. Included in progress report three is a printed circuit board (PCB) design.

Table 1: Assignment contribution towards the year grade.

Assignment	Contribution to the year grade
Project proposal	10%
Progress report 1	25%
Progress report 2	30%
Progress report 3	35%
Total	100%

In the context of this study, the study leader provided individual audio feedback to the students after each report was evaluated. The feedback aimed to give constructive guidance during the year as to what mistakes were made and how the student could improve the project. The audio feedback was given individually to each student via the use of audio voice notes on WhatsApp. A WhatsApp group was created by the study leader at the start of the module, as soon as the students were assigned to him. After marking an assignment, the study leader selects the specific student from the WhatsApp group and then records a private audio message for the student to review. At the end of the academic year, the WhatsApp group is deleted.

RESEARCH METHODOLOGY

For this research, a case study was used were quantitative and qualitative data were collected. Student perceptions on audio feedback were gathered from 30 students enrolled for Design Project III, during 2017. Students in this design-based module form the target population. No sampling technique was required as all students in this group completed the questionnaire (data collection instrument), which was administered via Google forms.

The link to the questionnaire was sent to each student via a WhatsApp group and the questions were derived from previous research focusing on the use of WhatsApp in education [23], which contributes to the content validity of the questionnaire. The questionnaire featured a 5-point Likert scale (strongly agree to strongly disagree) with 26 close-ended questions and one open-ended question.

Descriptive statistics are used to present the quantitative data, as the main features of a collection of data are described [24]. In this study, bar graphs are used to highlight the main features or significant aspects, of student perceptions relating to personalised audio feedback on their submitted assignments. Qualitative data was also collected from students to determine their individual experiences regarding the audio feedback that they received. Their responses yielded six thematic themes, which are presented in table form. According to Braun and Clarke, thematic analysis is used to identify, analyse and subsequently report patterns or themes within data [25]. This helps to condense many personal statements or short narratives that are similar, into a format, which is easy to read and understand.

RESULTS AND DISCUSSIONS

Results are presented in five sections; namely, student demography, cellular connectivity, possible advantages of audio feedback, possible challenges of audio feedback and some general open-ended questions. In the first section on student demography, 73% of the participants were male and 27% were female. This distribution correlates well with literature showing fewer females than males in engineering [26].

Regarding the age groups, most students (76%) were above 30 years of age. This may be because many students at distance learning institutions are older in age and part of the workforce [27], seeking to improve their current qualifications. A total of 8 different home languages were identified among the participants, with the most significant ones being Afrikaans (27%), English (33%) and Zulu (13%). The many different home languages testify to the fact that a diversity of students enrol with UNISA from any region in Africa. South Africa is also well known for its 11 official languages [28]. The medium of instruction for this module is English.

In the second section, regarding cellular connectivity, the results were as follows. Three leading cellular service providers exist in South Africa today, being Cell C, MTM and Vodacom [29]. This was also reflected in the student responses, where 53% were connected via Vodacom, 23% via Cell C, 13% via MTM and 10% from other networks. All of the participants indicated that they owned smartphones with Internet access via their service provider. The fact that most students have access to smartphones is shown in literature [30], which makes it possible for the study leader to use audio feedback via WhatsApp.

The third section of the questionnaire focussed on possible advantages of using audio feedback in higher education. As can be observed in Figure 1, 97% of the students indicated that they could better understand their grade after listening to the audio feedback provided by their study leader (50% strongly agree and 47% agree). A further 93% had a better idea of what to do to improve their grades in the future, and 90% indicated that the feedback was enough for them to identify mistakes.

If a student can understand how the grade is derived, it will give him/her a better chance of success with their next submission [31]. These positive responses from the students can be an indication that the study leader gave detailed enough information in the audio feedback for them to use, and to improve the quality of their future submissions. More questions on possible advantages revealed that 94% of the students were satisfied with the amount of audio feedback that they received and 93% said that it was constructive and helpful (see Figure 1).

This can be an indication that the study leader does not have to spend more time on individual feedback as the students were satisfied with the amount and content of the feedback. Students (93%) further responded that they would like to receive audio feedback in the future, with only 7% indicating that they would not like this. This positive response correlates well with literature, and shows that students value the interaction and hope to derive future benefits from audio feedback [32].
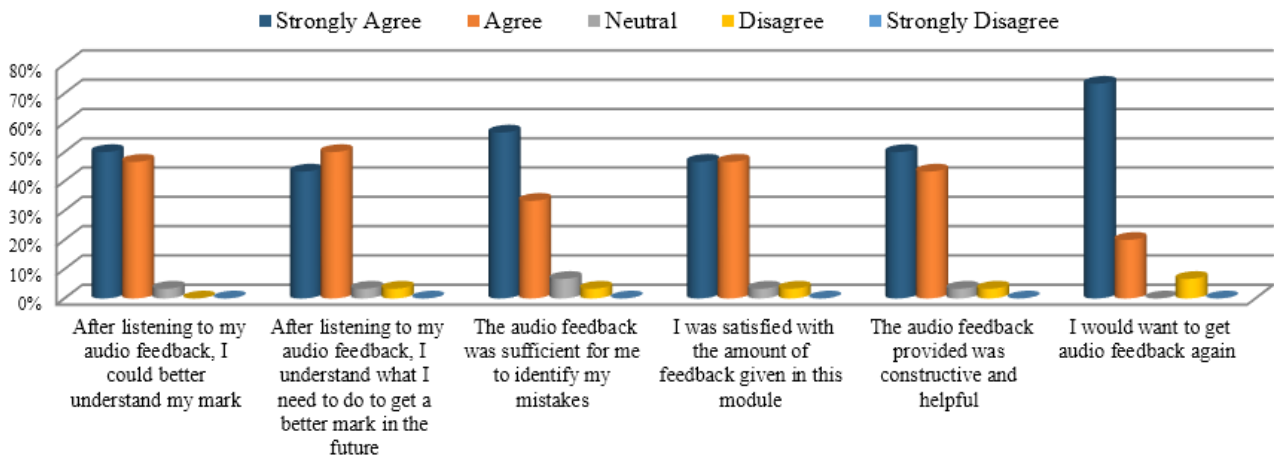
Figure 1: Students perceptions of possible advantages of audio feedback - part 1.

From the literature, it is evident that voice elements like tone, pitch, accent and pace all contribute to the meaning of a message [33]. This statement compares well with student answers, where most students said that the audio feedback was more personal (94% of students), contained more information (80% of students) and that it was easy to grasp the intent (90% of students) of the feedback (see Figure 2).

WhatsApp as an educational tool is used to create better communication between study leaders and students all over the world [34]. A question regarding the use of WhatsApp revealed that 97% of the students feel that it fostered interaction between them and the study leader, while 96% said that it made it easier for them to communicate with their study leader. Any intervention or tool that improves communication in a learning environment must be of value to all the role-players [35]. There was also an outcry from 97% of the students for more academics to provide audio feedback.
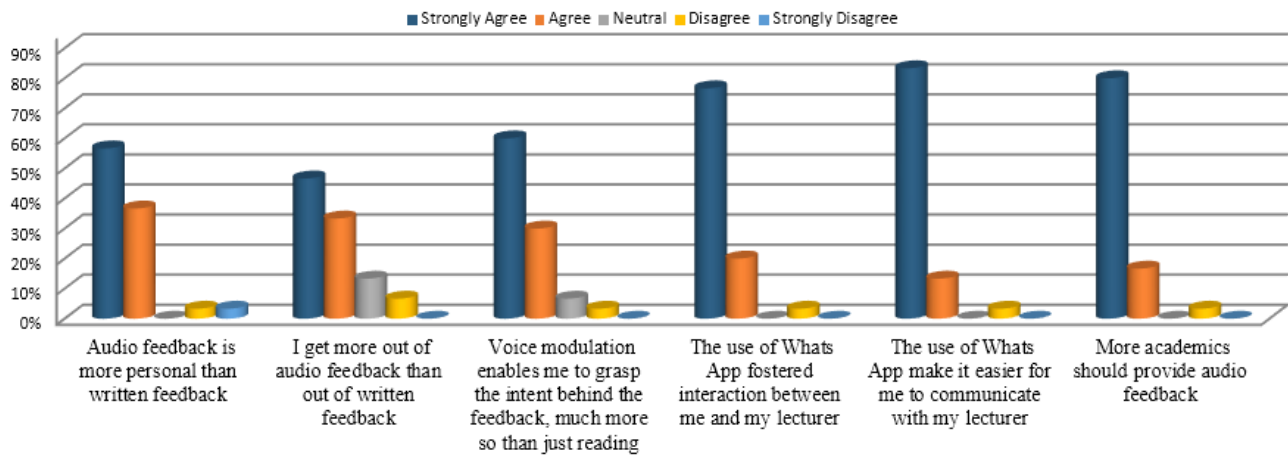

Figure 2: Students perceptions of possible advantages of audio feedback - part 2.

In the next section of the questionnaire, questions were asked regarding possible challenges of receiving audio feedback. A question was posed regarding the efficient use of time when considering audio feedback. 40% of the students were neutral, while 53% indicated that it was, indeed, time efficient (see Figure 3). A similar result was found by Ryder [36]. From these responses, it can be derived that most of the students were either neutral or positive that audio feedback was time efficient for them. Time efficiency relates to the ability of students to quickly locate and listen to the audio feedback via their cellular phones at any time or any place. There is no need, for instance, to first locate a rubric on the learning management system and then analyse the feedback from there.

With any technology, there is a possibility of technical problems. 67% of the students indicated that they did not have technical problems listening to the audio feedback, while 30% were neutral (see Figure 3). No technical problems were reported by students during the time that this study was conducted, and the study leader also did not experience any difficulty in the recording and distribution of audio to the individual students. The lack of technical problems may be contributed to the fact that WhatsApp is a matured technology that is widely used [37][38].

Internet bandwidth and data costs were reported as a problem by 10% of the students, with 63% not reporting it. Accessing campus Wi-Fi was a problem for 24% of the students, while 46% reported no problems in this regard. 6% of the students reported that audio files used too much of their data, while 63% said that it did not. It has been reported that students face bandwidth concerns at universities in South Africa [39].The fact that less than 10% of the students raised a concern regarding bandwidth, cost of airtime and data usage may be attributed to them being older students who have already joined the workforce. As such, they would have funds to cover these costs.
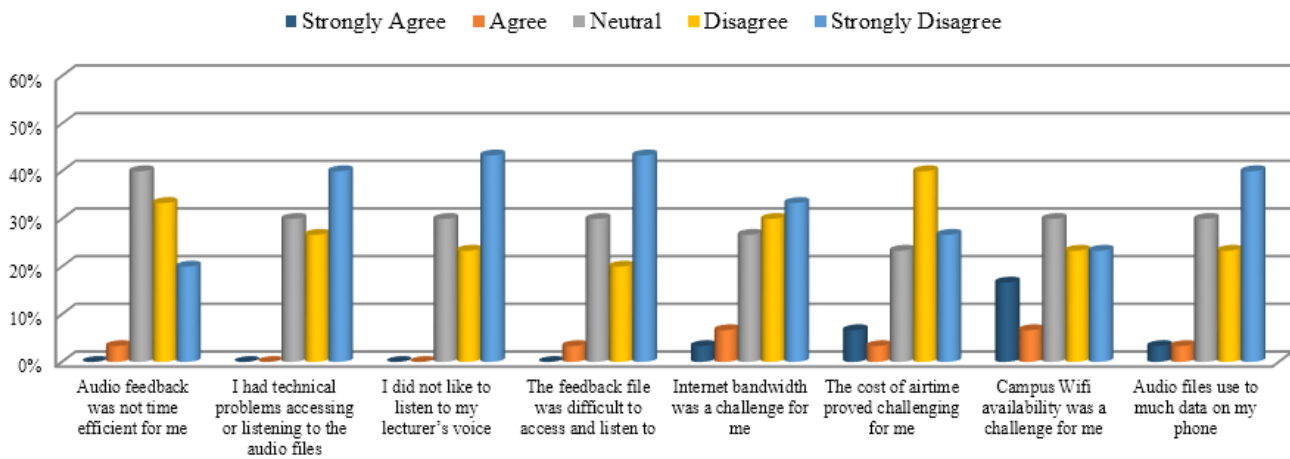
Figure 3: Students perceptions of possible challenges of audio feedback.

Students were asked to respond to their experience of receiving audio feedback from their study leader, as part of the last section focusing on general perceptions. Their responses were divided into a few thematic themes that are presented in Table 2. From these responses, 67% indicated that it was a good learning experience and 49% said that it was enjoyable. This can be interpreted as an indication of student satisfaction. Student satisfaction impacts on student motivation and performance and is a good indication of the positive effects of an intervention [40][41].

Proper time management and utilisation is an important matter for working and part-time students [42]. Better time utilisation was reported by 45% of the student responses, indicating that the process of audio feedback via WhatsApp helped them to improve their time management. 67% of the students responded that the audio feedback was, indeed, helpful, while 35% mentioned that it was informative. This again highlights the point that the audio feedback given to the students contained relevant information that was useful to them in completing their assignments. The importance of clear and effective communication are reported on in many studies in education [43][44]. From the student responses, 49% of the students indicated that better communication between students and the study leader was promoted by using audio feedback.

Table 2: Thematic themes regarding video reporting.

Thematic themes	%	Unedited examples of student comments
A good learning experience	67%	It was a great experience, and I could identify my mistake and work at improving them.
Enjoyable	49%	A good feeling of personal interaction.
Better time utilisation	45%	I feel that audio feedback is great, because it makes things easier to explain and is much more time efficient.
Helpful	67%	The feedback was concise and contained sufficient detail to enable me to improve my final result.
Informative	35%	I was never in any doubt what was expected of me.
Better communication	49%	Personalised feedback is conveying tone and intent.

CONCLUSIONS

Students in a design-based module at UNISA received audio feedback (intervention by the study leader) via WhatsApp regarding their submitted assignments. These students (all having mobile phones enabling them to receive personalised audio messages) responded to a questionnaire that sought to highlight their perceptions of receiving audio feedback, as well as the perceived advantages and disadvantages of this intervention. The majority of the students reported that the audio feedback was relevant to the evaluated assignments and that they could better understand how their grade was awarded. The students also indicated that they were able to use the audio feedback to improve on their next assignment.

Furthermore, receiving audio feedback was a good learning experience for them, while enhancing communication between them and their study leader. 93% of the students indicated that they would like to receive audio feedback on their assignments in the future and that more study leaders should provide this intervention. Providing audio feedback to students did not require extra costs or effort from the study leader. It may be a challenge for larger groups, which could be a limitation. However, considering the overwhelmingly positive responses that were received in this study, it is recommended that this intervention (providing audio feedback to students) be adopted by more academics at open distance learning institutions as they strive to improve student engagement with the study leader and course content.

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