Quality Of Literature Review And Discussion Of Findings In Selected Papers On Integration Of ICT In Teaching, Role Of Mentors, And Teaching Science Through Science, Technology, Engineering, And Mathematics (STEM)

Selection of papers to review

There are numerous educational journals published by universities in Zimbabwe, for example, Zimbabwe Journal (ZJ), not real name. The volume ZJ xx(x) mmyy is a publication with 7 papers and was conveniently selected. For purposes of the review, the author decided to look at three papers namely: „Integration of information and communications technology (ICT) in teaching and learning" (Paper_1); „role of mentors" (Paper_2); and „teaching science" (Paper_3). My selection was based on personal interest in the three areas studied; educational technology, mentoring and teaching science.

Further, to determine the quality of discussion in ZJ papers comparisons and contrasts were made with four papers from other journals, namely British Journal of Educational Psychology (BJEP), Eurasia Journal of Mathematics, Science and Technology Education (EJMSTE), European Journal of Teacher Education (EJTE), and Journal of Technology and Teacher Education (JTATE). The papers were selected on the basis that they addressed research problems or topics in the following areas educational technology, mentoring, motives and STEM, similar to the three ZJ papers cited previously.

INTEGRATION OF ICT IN TEACHING AND LEARNING (PAPER_1)

The authors of Paper_1 (mmyy) discuss introduction of computers in the school system, justifying investment in ICTs on the basis of the potential inherent in improving the quality of teaching and learning. The authors of Paper_1 (mmyy) delimit themselves to studying barriers and ways of overcoming or reducing impact of the impediments. Perhaps, there are two assumptions here; first the teachers were willing to integrate ICTs in teaching and learning science and mathematics, but were hindered by the presence of barriers; and second that if such impediments were removed or attenuated there were high chances of teachers successfully integrating ICTs in their lessons. Studies evaluating barriers to ICTs integration were likely to appeal to policymakers, administrators and practitioners interested in successful implementation of the innovation.

In their review of related literature, the authors of Paper_1 (mmyy) look at studies supporting teaching ICT skills because they prepare pupils for the world of work (Yelled, 2001; Grimus, 2000; Bransford et al., 2000) as well as studies supporting the argument that ICTs increase efficiency in teaching and learning in general (Wong et al., 2006; Grabe and Grabe, 2007) and more specifically as a resource and tool in learning science and mathematics (Gillespie, 2006; Murphy, 2006; Newton and Rogers, 2003; Pickergill, 2003; Kelleher, 2000) and increasing motivation (Osborne and Collins, 2000). The authors of Paper_1 (mmyy) also discuss literature revealing factors influencing successful implementation of ICTs and realization of the pedagogical benefits (BECTA, 2003; Gomes, 2005). The authors looked at relevant literature justifying the place of ICTs in teaching and learning of science and mathematics. However, the authors" literature about factors that influence successful adoption of ICTs suggests that they already knew barriers to ICT integration before conducting the study, for example, teachers fail to adopt ICTs in the classroom because of lack of training as supported by the quote below;

Correspondingly, recent research by Gomes (2005) relating to science education concluded that lack of training in digital literacy, lack of pedagogic and didactic training in how to use ICT in the classroom, and lack of training concerning the use of technologies in science specific areas were obstacles to using new technologies in classroom practice (The authors of Paper_1, mmyy, p. 226). The authors of Paper_1 (mmyy) used a survey to study 56 postgraduate students. The data collection instrument was a questionnaire administered at the beginning and again at the end of a compulsory ICT course "to determine (their) knowledge, attitudes and skills in the subject area" (p. 226). They reported seeking "differences in knowledge

before and after training" (The authors of Paper_1, mmyy, p. 226) using means and standard deviations, yet the sample items on page 227 do not seek knowledge of the students, rather seek „views". For this reason this study argues that it is not clear whether the authors of Paper_1 (mmyy) surveyed perceptions of their students or measured students" knowledge or confidence levels of integrating ICTs in science education.

Researchers listed barriers and asked students to choose those they thought were present in their work places namely "lack of ICT resources, lack of interest, lack of teacher confidence, resistance to change, lack of appropriate skills and insufficient time" (The authors of Paper_1, mmyy, p. 228). In the findings and discussion section the authors of Paper_1 (mmyy) examine "relationships between accessibility and competence and other factors such as time, funding, training and technical support" (p. 228). The list of barriers in the table differs from the barriers discussed; accessibility, funding, training and technical support were not included in the list on the questionnaire. Possibly there were open ended items used to collect such data, but how would a reader know this in the absence of sign posting.

The authors of Paper_1 (mmyy) explain the relationships between factors and how these impede successful implementation and integration of ICTs in teaching and learning science on pages 228 to 231. They conclude the paper by using their explanations of relationships between factors as basis for recommendations (p. 232). A novice researcher wanting to learn how to write a good discussion section is likely to be left no enlightened after reading this paper. On pages 228 to 232 the authors of Paper_1 (mmyy) do not refer to any literature at all. There is no single citation. An obvious purpose of using literature in the discussion section of a research paper is to establish whether findings were consistent with or show a departure from the literature cited at the beginning of the paper (pp. 223- 226). The paper ends with three pages listing references, and one section where the literature is required was the discussion.

The study found this paper to be interesting paper and that it came from a more extensive research study. In abridging the study for purposes of publication a lot of useful information may have been left out. However, three questions remain unanswered: Considering that the researchers were lecturers studying their own students does the study fit with the notion of survey? If not a survey what can be a better description of the study? If barriers highlighted in the conclusion and recommendations were things readily available in literature, what new things were coming from the study? The idea of administering questionnaire at the beginning of the course on ICTs and at the end looks attractive in studies seeking developmental changes. Unfortunately, in the discussion differences between views/opinions/perceptions at the start and end of the course were not examined, perhaps as a way of showing that the course made an impact. One of the important factors the authors needed to consider was political will in the form of an educational policy supported by government commitment in financing integration of ICTs in teaching science and mathematics (if not across the national curriculum).

ROLE OF MENTORS (MMYY)

The authors of Paper_2 (mmyy) studied student teachers" perceptions of mentoring, mentors and relationships. The students studied were training to become primary school teachers. The authors of Paper_2 (mmyy) begin by citing literature on purposes of teaching practice (Walters, 1994) and teaching as a practical activity (Maynard and Furlong, 1995). The researchers trace changes in teaching practice witnessed in Zimbabwe between 1980 and present day; from one term before 1982, then 3 terms between 1982 and 1984, and 2 years from 1985 to 1994. They cite literature discussing how teacher shortage determined the nature of teaching practice, that is, whether student teachers were assigned a full teaching load or not (Zvobgo, 1986; Taruvinga and Museva, 2003).

The authors of Paper_2 (mmyy) use literature on symbolic interactionism (Kirby et al., 1997; Giddens, 1997; Haralambos and Holborn, 1985; Ritzer, 1992; Levin and Spates, 1990) as a conceptual framework. They define supervision using literature (Wiles and Bondi, 1996; Taruvinga and Museva, 2003; Sergiovanni, 1982)

and mentoring (Maynard and Hagger, 1994) as the key terms. At face value the authors of Paper_2 (mmyy) cite extensively when discussing mentor"s role (Taruvinga and Museva, 2003; Hawkey, 1998; Maynard, 1997; Hapanyengwi, 2003; Yeomans and Simpson [1994] in Taruvinga and Museva, 2003; Haberman and Harris in Hapenyegwi, 2003; Sergiovanni, 1982; Sergiovanni and Starratt, 1993; Furlong and Maynard, 1995; Stones, 1984; Hawkey, 1998). However, on close scrutiny it appears the authors of Paper_2 (mmyy) cite mainly Taruvinga and Museva (2003) and Hapanyengwi (2003), and the rest being indirect quotations found in these two sources. Pyrzcak (1999) describes such literature review as a "series of annotations that are strung together" (p. 33). The major weakness being that authors of Paper_2 (mmy) fail to guide readers through their literature because they do not show how the references relate to each other and mean (Pyrzcak, 1999). This review argues that it would have been more worthwhile to locate literature cited by others and make direct quotations. In fact this is one purpose of review of literature; it directs you to more literature.

The authors of Paper_2 (mmyy) investigated students" perceptions of mentoring (role of classroom teacher, effectiveness, advantages and disadvantages, awareness of roles, opportunity to experiment and relationships). They described their research methodology as descriptive survey method (Mushoriwa, 1998) and used questionnaire, interviews, and focus group discussions to collect data. The authors of Paper_2 (mmyy) do not make it clear how many students were in the final year at college when the study was carried out. Such information would help any reader to determine adequacy of sample size used. They used simple random sampling to select 80 students but no details of the selection procedure were given. The authors of Paper_2 (mmyy) do not describe data analysis beyond mentioning that it was done "quantitatively and qualitatively". Findings would seem to suggest that they used frequency counts of agreeing and disagreeing with statements in the questionnaire; and as for qualitative analysis it appears the researchers cite what participants said in interviews. Perhaps they could have used coding to explicate meanings of their data. In the findings section data was presented under 14 headings but any reader is left guessing whether these were the emerging themes and codes.

The authors of Paper_2 (mmyy) made deliberate efforts Mudavanhu 193 to go back to the literature they had cited at the beginning and used the literature to discuss their findings. The authors provide novices with an important lesson of how to use literature in the discussion of findings. Though, a closer look at how literature was used in the discussion of findings suggests that in most cases the researchers were forcing literature onto their findings. For example, on pages 244 and 245 the authors of Paper_2 (mmyy) found out that when there were no trained teachers in schools, student teachers were left alone yet discussed this finding using literature on purposes of teaching practice (Maynard and Furlong, 1995; Taruvinga and Museva, 2003; Hapanyengwi, 2003).

Two occasions stand out as examples of good discussion of findings because direct links between findings and literature were stated. At the bottom of page 246, the authors of Paper_2 (mmyy) point out that their findings contradict observations by Hapanyengwi (2003). Again, on page 255, they report that findings were consistent with "the view that teaching is a practical activity" (Walters, 1994; Maynard and Furlong, 1995). In the next few paragraphs this review looks at instances where the authors of Paper_2 (mmyy) did not use literature they cited to illuminate their findings – what can be described as forcing literature onto findings. Specifically, the review looks at the discussion of findings on advantages and disadvantages of mentoring, value of skills imparted by mentor, and assessment of students by mentors.

The authors of Paper_2 (mmyy) found out that student teachers perceived "advantages associated with the mentorship programme" (p. 247). In the discussion, they write about role played by mentors and importance of learning through participation. They write about "equipping student teachers with relevant skills" (p. 247). The following literature was cited: Walters (1994), Maynard and Furlong (1995), Sergiovanni (1982), Lave and Wenger (1995) and Hawkey (1998). After reading the discussion it appears that „advantages of mentoring" and „roles of mentor" and „teaching skills" are different issues which must have been examined separately. Either the authors were not able to articulate the advantages clearly or they failed to locate literature

reporting advantages of the kind of mentoring studied over other models of mentoring. This could also be an example of poorly conceptualised literature (Boote and Beile, 2006).

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The authors of Paper_2 (mmyy) discuss "assessment of students by mentors" (p. 251). In the discussion, they chose to focus attention on a minority who for one reason or another reported that mentors did not assess them. The authors did not tease out reasons why classroom teachers or mentors were not able to assess student teachers. They write that "feedback … is an important component of supervision" (p. 251) and cite literature on importance of supervision; why mentors were not able to assess student teachers remains a secret.

TEACHING SCIENCE (MMYY) The review of the paper is based on what the author of Paper_3 (mmyy) wrote as an abridged version, and not the full study. At the beginning the author of Paper_3 (mmyy) looks at several concepts, for example, "educated illiterates", "science technology society", "scientific socialism", "scientific and technological literacy", and "curriculum". After reading the paper, it remains unclear why these concepts were introduced in the first place. Perhaps one of the points is that de-contextualised learning like what happens in the classroom or laboratory was divorced from the real life, and when students get into the real world they show ignorance of phenomena. If this was the purpose of citing Orr (1990) at the beginning, then it did not come out clearly. The notion of „science, technology and society" was introduced as a curriculum; yet this is not the only way to view Science, Technology and Society (STS). There is also STEM (science, technology, engineering, and mathematics). The thrust of STS (and/or STEM) is to develop students" interest in the subjects, to identify and use resources in the community, and to encourage collaboration among teachers and other professions all being aimed at enhancing learning of the subjects. The author introduces the term scientific socialism as if it were a teaching subject. The correct way of looking at scientific socialism is as political ideology or philosophy. Then what is important would be to show how an education system of a country can be shaped when the government"s political ideology is scientific socialism. The author made efforts to explain scientific and technological literacy, but still could have done more.

The author of Paper_3 (mmyy) uses National Science Teachers Association (NSTA) handbook to examine the goals of STS, and uses these to justify inclusion of STS approaches in the curriculum. Handbooks are classed as tertiary sources and not recommended in academic papers.

In the research question, general science is introduced as a curriculum; this is understandable if looked at as a form of micro-level curriculum otherwise a broader and more embracing definition of curriculum could have been used. The population was not defined as stratified and this makes it difficult for any reader to follow stratified random sampling suggested, perhaps convenient sampling. On pages 325 to 345 there was no reference to literature made. There is no citation made. Findings were presented on pages 328 to 345. The discussion was weak because there was neither interrogation of the different factors and how they related with each other nor reference to literature to show whether findings were consistent or different from studies made elsewhere.

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AUDIENCE AND READERSHIP

Some questions to ask are who the audience of ZJ are and what the readership is. In the call for papers, The Editor of ZJ invites "research papers on any educational topics written in English", and considering that most articles published target local community, ZJ is a journal likely to draw attention of teachers and those interested in educational research in Zimbabwe. Teachers, most probably, look for findings likely to impact positively on their practices, that is, „here and now" knowledge. On the other hand, those interested in educational research were likely to look for exemplary research papers, from which they could learn such skills as writing review of related literature, and writing a discussion section. It appears the three examples

examined offer limited insights or new knowledge to practitioners, and little to help improve researching and writing skills.

COMPARISONS WITH OTHER PAPERS IN SEARCH OF EXEMPLARY DISCUSSION

This study selected four papers to use for making comparisons and contrasts with articles from ZJ namely; "Barriers to the successful integration of ICT in teaching and learning environments: a review of the literature" by Bingimlas (2009); "Student teachers" beliefs about mentoring and learning to teach during teaching practice" by Zantig and Verloop (2001); "Starting points; teachers" reasons for becoming teachers and their perceptions of what this will mean" by Younger et al. (2004); and "Instrument for assessing interest in STEM content and careers" by Tyler-Wood et al. (2010).

Some indicators of quality, e.g. impact factor, are used to compare the journals. Citation analysis is widely used in research evaluation systems (González-Pereira, Guerrero-Bote and Moya-Anegón, 2010). The impact of scholarly journals is measured using, for example, the impact factor and is based on citation counts, and shows whose work gets cited in other research. Examples of databases of scholarly literature that provide citation analyses are the Thomson Institute of Scientific Information (ISI), Science Citation Index (SCI), Social Science Citation Index (SSCI), Arts and Humanities Citation Index (AHCI) (Klein and Chiang, 2004). In universities, the tradition has been that "academic success depends chiefly on getting published in „the good journals"" and for this reason "peers, administrators and grant-makers regard citation counts as a key measure of recognition and importance" (Klein and Chiang, 2004:135). Thus, it shows that in terms of impact factor, ranking and briefing it is easier to publish in ZJ than other journals cited, and therefore this review ranks it lowest being cognisant of the fact that meaningful comparisons and contrasts come from a combination of quantity and quality, and not just the quantity of citations received (González-Pereira et al., 2010).

Comparing Paper_1 with Bingimlas (2009)

It appears the two papers examined in this section share a lot in common, and demonstrate duplication as supported by evidence provided in the next paragraphs. First, the authors use similar words and expressions to Mudavanhu 195 justify use of ICT in the classroom and why it is important to study obstacles.

The use of ICT in the classroom is very important for providing opportunities for students to learn to operate in the information age. Studying obstacles to the use of ICT in education may help educators to overcome these barriers and become successful technology adopters in the future (Bingimlas, 2009:235).

Although you cannot find the exact quotation in the abstract written by the authors of Paper_1 (mmyy) the match appears in the introduction on page 222. Further, the rest of the introduction matches word to word with the one written by Bingimlas (2009). It seems necessary for the authors of Paper_1 (mmyy) to acknowledge Bingimlas (2009), lest they be accused of plagiarism. Bingimlas (2009) states that:

The findings indicate that teachers had a strong desire for to integrate ICT in education; but that, they encountered many barriers. The major barriers were lack of confidence, lack of competence, and lack of access to resources. Since confidence, competence and accessibility have been found to be the critical components of technology integration in schools, ICT resources including software and hardware, effective professional development, sufficient time, and technical support need to be provided to teachers. However, the presence of all components increases the possibility of excellent integration of ICT in learning and teaching opportunities (p. 235)

Bingimlas (2009) uses the same words again on page 241 when discussing "the relationship between the barriers". The authors of Paper_1 (mmyy) used the same words in their conclusion:

The findings of this study indicate that teachers had a strong desire for to integrate ICT in education, but they encountered many barriers to it. The major barriers were lack of confidence, lack of competence, and lack of access to resources. Since confidence, competence and accessibility have been found to be the critical components of technology integration in schools, ICT resources including software and hardware, effective professional development, sufficient time, and technical support need to be provided to teachers. However, the presence of all components increases the likelihood of excellent integration of ICT in learning and teaching opportunities (p. 231) The minor differences between the two quotes are the words in the above quote from Paper_1 (mmyy) that have been crossed out and replaced by words in italics.

The two papers show numerous matches, which have not been extensively cited to save space, for example, description of the purpose of the study see the authors; literature review, importance of ICT in education in the future and science education and ICT; findings and discussion; implementation; and conclusion. For this reason, this study concludes that close to 100% of what was published by the authors of Paper_1 (mmyy) matches what appears in Bingimlas (2009). The lists of references are similar and differ because Bingimlas (2009) gives a longer list, and correctly spells Yelland (2001) whereas the authors of Paper_1 (mmyy) used the spelling (Yelled, 2001), which is also absent in their list of references. The main difference noted is that between pages 237 and 241, Bingimlas (2009), unlike the authors of Paper_1 (mmyy), examines extensively "barriers to integration of ICT in education" under the themes "classification of the barriers", "teacher level barriers (lack of confidence, lack of teacher competence, resistance to change and negative attitudes), "school-level barriers (lack of time, lack of effective training, lack of accessibility, and lack of technical support".

It might be difficult to pin point the paper that was submitted for publication first. First, ZJ tends to have a backlog. One possible explanation is that funding has been problematic particularly 2008 when Zimbabwe‟s economy almost collapsed, and papers that had been accepted for publication stayed on the queue until funds were available. Second, ZJ does not have online publications making it difficult to spot cases of wording matching what has been published elsewhere early in the editorial review process.

The Eurasia Journal of Mathematics, Science and Technology Education is an online journal with open access (www.ejmste.com). Bingimlas‟s paper was received on 17th July 2008 and accepted on the 24th March 2009. Such information is absent in the print ZJ journal. Third, Bingimlas (2009) states that "the paper is part of PhD thesis which is currently being conducted by the author" (p. 243) making it possible to verify authenticity through contacting RMIT University, Bandoora, VIC, Australia. From Paper_1 (mmyy) one can only deduce from the description of the methodology that the authors were lecturers at a university in Zimbabwe, who studied their students. The authors appear on the editorial board of ZJ such that it is possible to seek verification from the publisher of the journal. Though it may seem difficult to check for similarities between an online publication and a print publication, there are opportunities of verification offered by the visibility of the editorial board in the form of contact details.

Comparing Paper_2 (mmyy) with Zantig and Verloop (2001)

While there is a gap of 10 years between publications of the two papers, a close examination of literature cited in the later paper by the authors of Paper_2 shows that most if not all was published before 2000; as such paper by Zantig and Verloop (2001) provides a fitting comparison with the authors of Paper_2 (mmyy). It is clear to any reader that Zantig and Verloop (2001) distinguish literature on researchers‟, teacher educators‟ and mentors‟ perceptions of mentoring (Hawkey, 1997; 1998) and literature on student teachers‟ perceptions of mentoring (Booth, 1993; Brown, 1995; Grimmett and Razlaff, 1988). Further, Zantig and Verloop (2001) distinguish literature on how mentors interpret their roles (Elliot and Calderhead, 1994), on that mentor role depends on assumptions about teachers‟ learning (Maynard and Furlong, 1994), literature on pitfalls and challenges (Feinman-Nemser and Parker, 1993), and accessing practical knowledge (Brown and McIntyre, 1995; Tomlinson, 1995). Zantig and Verloop (2001) categorize literature on student teachers‟

beliefs about mentoring into expectations and beliefs about good mentoring, literature on beliefs about learning to teach (Vermunt, 1996; Vermunt and Verloop, 1999), and literature on regulation of learning (Vermunt, 1996; Entwistle, 1988). Categorization of literature is missing in the paper by the authors of Paper_2 (mmyy). The discussion of literature by Zantig and Verloop (2001) appears easy to follow in the formulation of the problem.

In the discussion of findings, Zantig and Verloop (2001) clearly state similarities between their findings and Mudavanhu 197 literature e.g. on page 75 they write that "the students" expectations of their mentors were very similar to mentors" role expectations themselves, teacher educators and educational researchers that were described in the introduction". Student teachers in study reported by Zantig and Verloop (2001) "perceived „good mentoring" as the fulfilment of several functions", and to show that this was not completely new they cited literature (Wright and Bottery; 1997; Anderson and Shannon, 1988; Tomlinson, 1995). Further Zantig and Verloop (2001) found out that some student teachers "wished to discover themselves" indicating and "initiating role" (p. 76), and acknowledge that this was missing in literature where mentors got stuck in evaluating teaching performance rather than stressing reflection on teaching (Ben-Peretz and Rumney, 1991; Feinman-Nemser and Parker, 1993).

On the basis that the paper by Zantig and Verloop (2001) was published in one of the top journals and by The British Psychological Society it is justifiable to rate it as a better paper. The British Journal of Educational Psychology is listed on Social Sciences Citation Index (SSCI) whereas ZJ is not. The 2011 impact factor of 1.423 is high on Psychological Research Index. The brief is psychology, that is, „The British Journal of Educational Psychology is prepared to consider for publication reports on empirical studies of likely to further our understanding of psychology". The rejection rate was most likely to be higher than that of ZJ, which accepts „research articles on any educational topics".

Using paper by Younger et al. (2004)

Here, paper by Younger et al. (2004) has been examined more extensively, to illustrate how review of related literature, data and findings, and discussions can be linked. Younger et al. (2004) studied student teachers" reasons for becoming teachers. The aim here is to provide what can be considered an exemplary discussion of findings. In the first snapshot (Appendix) "coming to terms with teaching: why teach?" Younger et al. (2004: 247) discuss literature (Reid and Caudwell, 1997; Haydn et al., 2001; Edmonds et al., 2002) prior to data presentation. They argue that in the 1990s and early 21st century research focused on factors that attract teachers and findings suggested intrinsic motivations and positive experiences of schooling and teaching as the most important determinants of joining teaching. This is critical to provide a historical and developmental account of motives for becoming a teacher. In the second snapshot, direct reference to data within the DEBT research is given (Younger et al., 2004). Further, the authors make direct links between literature (Edmonds et al., 2002) and 198 Educ. Res. Rev. their data and findings and point out what their study revealed and how that differs with literature used. The potential for extending knowledge of motives for becoming a teacher is evident. The authors argue that motives are complex, for example, candidates choose teaching to continue learning subjects of interest and to share enthusiasm of learning the subject with others. Finally, the third snapshot "reasons for becoming a teacher" Younger et al. (2004: 258) distance themselves from their data and literature to tease contrasts between their findings and literature (Reid and Caudwell, 1997; Haydn et al., 2001) and at the same time propose an explanation. The authors show contradictions between trainee teachers" motives and views of TTA and DfES, e.g., that trainee teachers think it is morally right to join teaching, whereas TTA and DfES think number of potential candidates can be increased by making the profession more attractive. Younger et al. (2004) are able to go beyond re-inventing the motives and suggest new ways of looking at how the motives relate and counteract what discourage them from becoming teachers. The authors deepen our understanding of trainee teachers" motives, more than reported in previous research studies.

Paper_3 (mmyy) compared and contrasted with TylerWood et al. (2010)

Tyler-Wood et al. (2010) analysed two instruments created to assess perceptions of Science, Technology, Engineering and Mathematics (STEM) disciplines (or content) and careers. Their paper "describes internal consistency reliability, as well as the content, construct and discriminant validity for each of the instruments" (p. 342). From the onset, Tyler-Wood et al. (2010) make it clear that professional development programmes were initiated for teachers aimed at an outcome of changes in students" STEM career interest. Such a clarification is missing from Paper_3 (mmyy). For example, "The Middle Schoolers Out to Save the World (MSOSW)" was part of "Innovative Technology Experiences for Students and Teachers program (ITEST)" established in response to shortages of Information Technology workers in the United States. They cite National Science Foundation NSF (2009) and point out that the two instruments were aimed at "assess[ing] and predict[ing] inclination to participate in the STEM fields and… measure[ing] and study[ing] the impact of various models to encourage that participation". Further they show awareness of using tracking to determine effectiveness of ITEST initiative by measuring interest and mastery in STEM content and careers, and suggest that where tracking was not possible seeking perceptions was appropriate using STEM Semantic Survey and the Career Interest Questionnaire.

In their review of related literature, Tyler-Wood et al. (2010) examine the literature on need for highly capable scientists in the technology-oriented market (Lubinski and Benbow, 2006), and literature on shortage of STEM workers (Workforce, 2002). They argue that some ways of determining career interests (Whitfield et al., 2008) focussed on "general career interest not specific to STEM careers" (Tyler-Wood et al., 2010: 333). Other instruments examined were The Scientific Orientation (1995) which could be outdated (Rogers, 2002), Novodovorsky"s (1993) interest used by Oinstein (2006), and Teachers" Attitude Towards Information Technology Questionnaire (TAT) by Knezek and Christensen (1998). Their discussion reveals how the study reported resembles and differs from previous research. TylerWood et al. (2010) give details of their instruments, data collection and analysis. Considering that their aim was to use statistical tools to determine reliability and validity of the two instruments in question, in the discussion section it is understandable that they refer to literature sparingly.

Conclusion

In the review reported here it appears that authors cite relevant literature extensively in the background to the study and literature sections, but use literature sparingly in the discussion of findings, e.g. Paper_1 (mmyy). Further, when literature is used in discussion of findings often it was used to confirm what was already known, and not to show how studies reported contribute to knowledge e.g. Paper_2 (mmyy). In conclusion, the discussion of literature in most of the papers published in one Zimbabwe Journal were not critical enough and could be rated as low quality papers in such areas as theory, methodology and discussion of findings when compared with papers in other international journals. If quality articles are not published editors, reviewers and authors stand to lose credibility.

It seems the Zimbabwe Journal studied was failing to attract authors who write high quality papers. Perhaps the journal should widen its focus and target international readership because at present, as revealed in the study, the quality of discussion of literature reviewed appears too low to reach out to high calibre academics. It could be that the journal lacks sponsorship, and considering the economic situation in Zimbabwe, relies on publishing papers originating from those who can pay for their papers to be published.

Therefore, this study recommends that the Zimbabwe Journal should focus on publishing papers of immediate relevance to teachers and educators. Further, editors are recommended to embark on an aggressive marketing strategy of the journal so that readership can be increased to the point where revenue generated can sustain further publications.