Full Length Research Paper

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)

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The purposes of this study were to examine the extent to which literature was used to discuss findings in selected papers from Zimbabwe Journal, and to compare the quality of reviews in this journal with other international journals. The study was largely qualitative in nature and used convenient sampling. In the study, the Zimbabwe Journal was chosen because of easy access. Three papers were conveniently selected based on personal interest and areas previously studied. Content analysis was used to compare the quality of discussion of literature in the sampled papers. Findings suggest that authors cite relevant literature extensively in the background to the study but use the same literature sparingly in the discussion of their results. Further, in the discussion of findings, the use of literature was limited to confirming what was already known, and does not show how the new studies reported contribute to knowledge. The study concluded that the journal studied was failing to attract authors who write high quality papers. Perhaps the journal should broaden its brief and target an international audience, because at present as evident in the three cases cited, the journal can only reach out to practitioners within (Southern) Africa.

Key words: Literature review, information and communications technology (ICT), mentoring, science, technology, engineering, and mathematics (STEM).

INTRODUCTION

Literature reviews are important in dissertations and journal articles. In dissertations candidates are expected to demonstrate a formal understanding of literature in their field, intellectual independence, information fluency, and ability to continually reappraise ideas and practices (Boote and Beile, 2006). The same is expected in journal articles. Researchers' aim of presenting a literature review is to show that he or she has read, and understood the

main published work concerning a particular topic (www.library.bcu.ac.uk/learner/writingguides/1.04.htm). Critics agreed that most literature reviews are inadequate but differ on why this was the case. They agree that researchers cannot perform effective studies without an adequate grasp of literature on the topic of interest. One group of critics is for a scholarly understanding of literature whereas the other group argues that at times

only an understanding of relevant literature was important. These views are on two ends of the same continuum; one end, a comprehensive literature review and the other end a narrower more focused discussion of relevant literature.

For example, Maxwell (2006) argues that literature review required in articles for publication is different from that required for dissertations (conceptual framework that discusses relevant literature), Boote and Beile (2006) are in favour of a thorough and sophisticated literature (scholarship). Further, there is a lack of published information on how to write a literature review (Randolph, 2009; Boote and Beile, 2005). The purposes of this paper were to examine the extent to which literature was used to discuss findings in selected papers from Zimbabwe Journal, and to compare the quality of reviews in this journal with other international journals.

WHAT IS 'REVIEW OF RELATED LITERATURE'?

In its simplest form review of literature is a description of what others have published presented in the form of summary(ies). For example, Younger et al. (2004: 247) point out that previous studies on teacher education in the United Kingdom focused on "factors which attracted or alienated potential recruits and those already in training". Studies cited suggest that trainee teachers were attracted to teaching largely for perceived intrinsic reasons related to the profession and by the positive experiences of schools, classrooms, and teachers (Younger et al., 2004). However, a simple description of what others have published in the form of a set of summaries is considered inadequate (Boote and Beile, 2005). A more complete review of related literature should take the form of a critical discussion, showing insight and an awareness of differing arguments, theories, and approaches (Boote and Beile, 2005). It should be a synthesis and analysis of the relevant published work, linked at all times to own research purpose and rationale.

Literature review is therefore the selection of available documents (both published and unpublished) on the topic, which contain information, ideas, data and evidence written from a particular standpoint to fulfil certain aims or express certain views on the nature of the topic and how it is to be investigated, and the effective evaluation of these documents in relation to the research being proposed (www.sagepub.com/upmdata/28728_LitReview_hart_Ch apter_1.pdf).

Purposes of review of literature

The goal of review of literature is to provide a justification

of the proposed research and this can be achieved through four main objectives. These are to review published literature (to identify and summarise relevant theories and researches), to critique the literature (identify arguments for and against theories, assess value of research claims, and identify limitations in previous research), to identify gaps in literature (to identify the gap in knowledge and areas that have only been partially researched) and to inform proposed research (provide a rationale, background/context for proposed research and guide selection for an appropriate design and methodology). The aims and objectives of literature review can be stated as questions:

1. What are the key sources?
2. What are the key theories and ideas?
3. What are the main questions and problems that have been addressed to date?
4. How is knowledge on the topic structured and organised?
5. What are the origins and definitions of the topic?
6. What are the political standpoints?
7. What are the major issues and debates about the topic?
8. How have approaches to these questions increased our understanding and knowledge?
(www.sagepub.com/upmdata/28728_LitReview_hart_Ch apter_1.pdf).

By explaining what has been done and what has not been done the researcher gives a justification of own contribution. In the discussion section, literature is used to support and criticise the findings of others in light of new findings. In the case of Younger et al. (2004: 248) findings show similarities to earlier studies and further to that "a complexity of constructions of subject and teaching". Some trainees were attracted to teaching by the perceived intrinsic value of the subject itself, and the opportunity to continue within the subject area and others by their own positive schooling experiences (Younger et al., 2004).

Research papers begin with an introduction in which literature is cited to introduce the problem, establish its importance, provide an overview of the relevant literature, show how current study will advance knowledge in the area, and describe the researcher's specific questions (Pyrzcak, 1999). Review of related literature plays a crucial role in formulation of research problem and the whole process of research. It is often argued those research problems not grounded in current literature are weak. Of interest in this paper is using literature to discuss research findings, and answer the following questions:

1. To what extent is literature used to discuss research findings in papers published in Zimbabwe Journal?

2. How good is quality of papers published in Zimbabwe Journal compared to other international journals?

Literature search and review

One assumption made in this study is that sources used in literature review are an indicator of the quality of paper being evaluated. Literature reviews use a combination of primary, secondary and tertiary sources to document and analyse what has been published on any given topic through time. Academic research is based on primary sources whereas literature review is based on secondary sources.

Ideally a researcher uses tertiary sources to develop a general concept of the topic, then consults secondary sources to see what has been already written on the topic, at different times and from different points of view, by other scholars (review of the literature). Then, the researcher, being guided by review of what already exists, consults primary sources to develop his/her own view of the topic. Tertiary sources are rarely used in academic writing because they only provide general and simplified background to the topic.

Literature search is the systematic process of identifying potentially relevant studies to review academic databases and websites using keywords and phrases. The process may require delimiting timeframe and geographical coverage. Once potentially relevant literature has been identified the next step is screening, that is, applying predetermined inclusion and exclusion criteria that have been derived from the research/review question and sub-questions. This paper is more interested in the steps like: data-extraction, synthesis, and reporting. Data-extraction is the examination of studies to assess the quality of the study and extract evidence in support of the in-depth review. Synthesis involves data analysis and identification of key themes. Systematic review process provides a sound framework for undertaking a comprehensive and transparent assessment of available research (Bimrose et al., 2005).

Cooper 's (1988) taxonomy is a coding system that uses six characteristics (and over 20 categories) to evaluate the quality of literature reviews. The six characteristics are focus, goal, perspective, coverage, organization, and audience. Others, like Boote and Beile (2005) used Hart's (1999) criteria to develop a framework from which to analyse literature reviews. Hart's (1999) criteria and Boote and Beile's (2005) 12-item scoring rubric are similar in that they are all based on Cooper's (1998) taxonomy.

METHODOLOGY

My study though not based on any literature review approach, was

largely qualitative in nature and guided by themes emerging in the papers examined. Content analysis was used to compare the quality of discussion of literature in the various papers.

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, aware-ness 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 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).

The authors of Paper_2 (mmyy) reported that conflict between student teacher and classroom teacher was a significant disadvantage. The authors did not fully explore the view that "there is need for mentors and student teachers to improve their relationships" (p. 248). It would be more fruitful to examine what happens when conflicts between mentees (student teachers) and mentors (classroom teachers) are not resolved. The authors did

not cite studies reporting similar interpersonal relationships. Further, it is not clear whether literature on symbolic interaction cited was used at the right place (Kirby et al., 1997; Haralambos and Holborn, 1985; Rotzer, 1992; Levin and Spates, 1990). The authors seem to mix discussion and recommendations when they write "mentors need to re-examine their roles…" (p. 248) and go on to cite literature on roles of mentors (Yeomans and Sampson, 1994; Taruvinga and Museva, 2003; Maynard, 1997; Maynard and Furlong, 1995). The authors made an unsubstantiated conclusion, and this would rather be stated as a possible way forward.

On page 248 the authors of Paper_2 (mmyy) discuss "values of skills imparted by mentor". Data presented suggest that students thought that they were learning through socialization and observing how classroom teachers were doing things e.g. being resourceful, treating pupils as individuals, behaviour management and flexibility. The other views sought were about the skills demonstrated by the classroom teacher; drilling, interpreting syllabus and keeping records. Again, authors cite the wrong literature; they use literature summarizing the role of mentor and school in initial teacher education (Hawkey, 1998; Maynard, 1997; Hapanyengwi, 2003; Maynard and Furlong, 1995). The authors of Paper_2 (mmyy) neither cited studies done elsewhere which report that this was what students thought about mentoring nor point out if their own study was the first. The authors do not state whether their findings were consistent or different with those from studies by others.

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 (www.uta.fi/FAST/FIN/RESEARCH/sources.htmal). 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.

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).

   As shown in Table 1, 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). Table 1 therefore 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 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

Table 1. Comparisons and contrasts of journals using some quality indicators.

Indicator	BJEP	EJMSTE	EJTE	ZJ
2011 impact factor	1.423	0.032	0.566	----
2011 Ranking	20/51 (Psychology Educational)	(SCImago Journal and Country Rank)	119/203 (Education and Educational Research)	(Library Congress)
Publisher	Wiley-Blackwell	Moment publication www.ejmste.com	Thomson Reuters	A university in Zimbabwe, Human Resources Research Centre
Frequency	4 issues per year	4 issues per year	4 issues per year	3 numbers per year
Brief	Psychological research	Mathematics, Science and Technology Education	Theory, policy and practice in teacher education	Any educational topics
Evaluation	Psychology Educational	SCImago Journal and Country Rank	Education and Educational Research	Quarterly Index of African Periodical Literature. Ended 2011
Editorial Board	International	International	International	Local
Editorial Advisory Board	International	International	International	International
Editors	Harriet Tenebaum and Andrew Tolmie	Mehmet Fatih Tasar (Editor-in-Chief) Muhammet Usak (Executive Editor) Annette Gough (Associate Editor)	Kay Livingston Geri Smith	EEEEE (Editor-in-Chief)

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 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

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 Tyler-Wood 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. Tyler-Wood 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.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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APPENDIX

First snapshot

Coming to terms with teaching: why teach?

Studies on teacher recruitment and retention in the UK, partly in response to the apparent 'crisis' in teacher supply experienced throughout the 1990s and the early years of the 21st century, focused attention upon a wide variety of factors which either attracted or alienated potential recruits and those already in training (Reid & Caudwell, 1997; Reid & Thornton, 2000; Whitehead & Postlethwaite, 2000; Chambers et al., 2001; Haydn et al., 2001; Moran et al., 2001; Edmonds et al., 2002; Thornton et al., 2002). Consensual conclusions from these studies have suggested that trainee teachers are attracted to the profession 'largely for intrinsic reasons ... (related) to the profession itself and to personal fulfilment' (Edmonds et al., 2002, p. 9) and that trainees were led into teaching by 'the positive experiences of schools, classrooms and teachers' (Thornton et al., 2002, p. 41) which they had encountered during the course of their own education.

Second snapshot

schooling, the intrinsic reasons identified by Edmonds et al. were centrally linked to trainees' desire to continue to work with their subject. Indeed, our research revealed that 88% of the trainees identified 'subject' as a major factor in their decision to follow a PGCE course. However, this apparent homogeneity of response carries with it a complexity of constructions of subject and teaching. For some trainees it was the perceived intrinsic value of the subject itself, and the opportunity to continue working within the subject area, which drew them to teaching:

> I love the subject (mathematics). I think it's fascinating ... I also think it's such a beautiful subject. There is so much symmetry and pattern and everything else that a lot of people miss because they see it as copying out of textbooks and doing boring questions. But there is so much to it and I just love it and find it a really fascinating subject.

For others, however, an additional dimension to the 'love of the subject' was the desire to share their own enthusiasm and pleasure in the area with others, to communicate ways of seeing the world through different lenses:

> I've just always loved reading ... and if I can foster that same sort of love in other people, children, that will be great.

Third snapshot

Reasons for becoming a teacher

In their rationalizations of their reasons for becoming teachers, there is a significant mismatch between the aspirations and notions of our trainees and some of the current views of the Teacher Training Agency (TTA) and Department for Education and Skills (DfES). Some of the views espoused by the TTA suggest that teaching might be a career to be entered, left and re-entered at different times, and these are supported by DfES notions that the motive for *entering* the profession is salary, fast tracking of career and early promotion to positions of power outside the classroom. This is in direct contrast to the views expressed here by our trainees, which place emphasis on teachers making a valuable contribution to society and having certain essential qualities and attributes as role models, views which make implicit the notion of vocation and a moral imperative to make a positive and principled contribution to society.

At this stage of their proposed career trainees construct their career choice not in terms of career progression (Reid & Caudwell, 1997) nor in terms of salary opportunities (Haydn *et al.*, 2001), but in terms of intellectual challenge and a commitment to transforming opportunities for children, both in the classroom and in wider societal contexts. Trainees are strongly motivated towards a career in teaching and have sustained this despite strong discouragement both from within and outside the profession; in so doing, they frequently appear to draw on a strongly moralistic positioning in order to withstand this discouragement.