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CRITIQUING AND REPLICATING RESEARCH ARTICLES TO ENHANCE STUDENTS' RESEARCH SKILLS

Hardson Kwandayi
Zimbabwe Council for Higher Education,
P. Bag H100, Hatfield, Harare, Zimbabwe
hpkwandayi@zimche.ac.zw

Tenson Muyambo
Great Zimbabwe University, Masvingo, Zimbabwe
tmuyambo@gzu.ac.zw

ABSTRACT

The paper observes that many postgraduate students worldwide face numerous challenges when creating their dissertations. The challenges include a failure to formulate the research problem, craft a concise topic, structure the dissertations, professionally present the collected data, to name a few. To address these problems, the paper examined how critiquing and replicating research articles by university students could be useful instructional methods for teaching research skills. The study used document analysis and observations to examine how this method could enhance students' understanding of the research process. The importance of this research is that it reveals how published, reputable research articles can be useful teaching aids in the teaching of research methods courses. The study suggests guiding questions that should assist students to critique research articles.

Keywords: Education, imitation, social learning, modelling theory, learning by doing.

1. INTRODUCTION

Most postgraduate programmes require students to create dissertations in partial fulfilment of their degree requirements. However, despite the importance attached to these dissertations, there are worldwide concerns from many stakeholders that most dissertations do not meet expected international standards (Komba, 2016). As a result, the poor quality of some dissertations by postgraduate students has prompted scholars to research the topic by focusing on the difficulties students face in performing their research as well as writing their dissertations. The majority of the studies conducted globally found that, at most, dissertation reports did not meet expected standards (Wang & Li, 2008).

A review of related literature showed that the completion of students' dissertations is affected by several factors related to research methodology such as determining the research design, the development of relevant data collection instruments, conducting data analysis, and how to write the research report (Akyürek & Afacan, 2018). Also, Shaminda-Wanasinghe (2020) observed that students' inability to review related literature affected their decision-making regarding the whole research process. This is an important aspect because the review of literature should illuminate the whole research process. Matin and Khan (2017) from Bangladesh revealed that students

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lacked adequate knowledge to conduct research. Their study noted that failure to keep pace with the research plan led to students' anxiety and frustration during the research period. In another study in Sri Lanka, Lekamge (2018) found that most students who were pursuing a Master of Education degree had problems in stating their research problems, research objectives and deciding upon a research title. The students also used vague terms in writing their dissertations. A recent study by Shahsavar and Kourepaz (2020) revealed that most students were not able to critique, synthesize or explain the reviewed literature. The two researchers noted that the students focused primarily on summarising the findings and the interpretations of other researchers. It is clear from the foregoing that many students face challenges when writing their dissertations.

In the Zimbabwean context, our experiences as dissertation supervisors of postgraduate students show that the quality of dissertations reveals candidates' weaknesses in presenting different sections of the dissertations. The weaknesses are generally widespread in all chapters that include the introduction, review of literature, theoretical and/or conceptual framework, research methodology, data presentation, analysis and discussion, with the concluding chapter summarizing the findings and putting forward the recommendations.

To address the problem of the generally low quality of dissertations worldwide, several studies have been conducted. Most of these studies emphasised issues of dissertation supervision and the challenges students face in writing their dissertations (Bitchener & Basturkmen, 2006; Wang & Li, 2008; Divsar, 2018). Based on these studies several challenges were distilled on what postgraduate students face in writing their dissertations. These challenges include, among others:

- Failure to identify and evaluate relevant literature;
- Difficulties in finding a sound and researchable topic;
- Failure to select and use an appropriate research design;
- Failure to present findings according to the research objectives, questions or hypotheses;
- Inability to identify knowledge gaps from the reviewed literature;
- Inability to state clear research objectives and/or research questions;
- Inadequate analysis and interpretation of the findings; and
- Inadequate discussion of the findings.

In efforts to address the foregoing challenges, some university instructors who teach research methods courses now use previous research articles as teaching aids to enhance students' understanding of the research process (Ingham-Broomfield, 2014). However, there are no clear guidelines on how instructors could effectively use research articles to teach the research method course. Hence, this potentially useful research teaching aid is rarely put to good use. Another potential instructional method of teaching research is a replication of previous research (Ambuske et al., 1988). Given the challenges students face to complete their dissertations amidst a lack of guidance on how students can use research articles to learn more about the research process, it was decided to research how students can benefit from

critiquing and replicating published and reputable research articles. No known research has been done with the same intention in institutions of higher learning in Zimbabwe. Critiquing a research article is an impartial assessment of the strengths and weaknesses of a research article being reviewed. However, it should not be viewed as a process of disparaging the work of the researcher(s). On the other hand, replication of research refers to redoing a published study to enhance the student's research knowledge and skills. This is an unusual type of replication as it is solely meant to assist the student to understand the research process.

Desk research was undertaken to address the following research objectives:

i. Identify instructional methods viewed as ineffective to teach a research methods course;
ii. Identify instructional methods viewed as effective to teach a research methods course;
iii. Distil from the documents reviewed, theories that explain why some methods of teaching research are effective;
iv. Examine the benefits students derive from critiquing published empirical research articles; and
v. Propose steps that students can follow under the guidance of their instructors to successfully critique published research articles.

2. METHODOLOGY

The study applied a qualitative research approach to address the research questions. Concerning data collection, documents and observations were used as sources of the data. The documents included previous research articles and books. Hence, the research depended on document analysis which is a form of qualitative research in which documents are interpreted by the researcher to give meaning to a given topic (Bowen, 2009). As a qualitative research method, Wood et al. (2020:457) maintain that document analysis stresses "underlying meanings, themes and patterns in a given document". The Colorado State University (2021) argues that document analysis involves content analysis which researchers use to determine the existence of certain concepts or words in a text or set of texts. Researchers analyse and quantify the existence, meaning and relationship of these words or concepts, and then make conclusions about the messages in the texts. In analysing the documents, the content was coded from the documents into themes similar to how focus group or interview transcripts are analysed (Bowen, 2009). The use of document analysis in this study had several advantages. First, document analysis was found to be an efficient and effective way of gathering data. Second, the documents were readily available on credible e-library sources. Finally, documents, in general, are stable data sources, which meant that they can be easily read and reviewed several times without changing during the research process (Bowen, 2009).

In searching for documents to analyse, the research objectives served as the guide. In this regard, documents included teaching approaches that negatively affect

students' understanding of the research process; theories that explain the role of modelling teaching; and the potential benefits of critiquing research articles of other scholars. To triangulate documentary analysis, participant observation method was used as students' experiences and difficulties were observed in the research methods course during dissertation supervision. Being lecturers supervising dissertation writing at university, the observation method enabled the researchers to "study behaviour in situ" (Ciesielska et al., 2018: 42).

3. RESULTS AND DISCUSSION

Guided by the set objectives, this desk research revealed the following findings, which are presented below.

3.1 Ineffective methods to teach a research methods course

The first objective of the study was to identify instructional methods which are viewed as ineffective to teach research methods courses. This study revealed that the predominance of the lecture method was identified as one of the major barriers to effective teaching of the research methods course. Poor research methods training in universities was confirmed by Groessler (2017) who noted that most research method courses are largely lecturer-dominated. To this end, Groessler (2017:2) said "literature revealed common challenges around teaching research methods for both students and educators; many of these stem from the need to alter teaching practice from principally lecture-based to active and authentic learning strategies". Authentic learning entails allowing learners to perform hands-on research by immersing them in actual research projects where they follow the steps of the research process.

While the lecture method has the main advantage of handling large classes, its focal limitation is that it makes students passive listeners. The method also violates the principles of active and authentic learning. Furthermore, the method ignores the individual learning styles of the learners. Some scholars view the lecture method as rote learning which is largely monotonous. With the lecture method, Hill (2015) says that the instructor decides the content and mode of delivery, with the learners as passive recipients of the information. However, Freire (2007) argues that learners are not empty containers to be filled with subject content. Instead, students should be creatively engaged so that both the teacher and student collaborate on their learning. Using this approach, the students think critically as they share their ideas and thoughts with the lecturer. Students also meaningfully participate in class activities and during the process, both the lecturer and the learners engage in dialogic interactions which enrich the teaching and learning processes. The importance of dialogic interaction is also emphasised by Gillies (2016: 188) who noted that:

> *Teachers do this when they engage in dialogic teaching practices where they actively listen to students, probe, challenge, and scaffold their understandings while encouraging them to explicate their reasoning and thinking. In turn, students engage in dialogic exchanges when they listen to others,*

> *share ideas and challenge alternative propositions while being prepared to substitute others' ideas for one's own when there is value in doing so.*

Authentic learning in universities in Zimbabwe is common in some disciplines such as geography. For example, Geography students are often expected to carry out practical research projects such as assessing the sphere of influence of a city. In this regard, the Geographical Association (2020) says that:

> *Fieldwork is an essential ingredient of geography because it provides a 'real-world' opportunity for students to develop and extend their geographical thinking; it adds value to classroom experiences… Geography fieldwork is very much 'hands on'; when students are involved in fieldwork enquiries, they are collecting primary data; formulating questions to investigate; seeking answers to their questions; and communicating their findings.*

In some cases, the students even go as far as testing specific theories in Geography. The authors contend that empirical testing of theories as part of authentic learning can take place in nearly all disciplines if students are given adequate guidance. In this paper, modelling research articles as a strategy to teach the research methods course is proposed as part of authentic learning. This entails critiquing published original research articles as well as asking students to replicate some of the articles as class research projects.

3.2 Effective instructional methods to teach research methods course

It was determined during this desk research that critiquing empirical research articles is considered an effective method of teaching a research methods course. Accordingly, Harris (2006) and Ingham-Broomfield (2014) say that critiquing the research of other scholars is a useful method of scaffolding students' success in research. They also noted that critiquing research helps to communicate research evaluation criteria. The other instructional method which this study found effective was the replication of research articles. Ambuske et al. (1988) view replication as an innovative pedagogy to teach a research methods course at the undergraduate level. They further observe that replication involves selecting and duplicating existing published research. The main advantage of replicating previous research is that it promotes practical experience by doing research from the beginning of a research project to the end. Replication also engenders a sense of confidence among students to conduct a research project bearing in mind that the study was previously undertaken by accomplished researchers. However, for experienced researchers, replication is also important because it has the potential to empirically support the findings of the original study, either by clarifying issues raised by the original study or extending its generalizability (Explorable.com, 2021).

3.3 Theories that explain the effectiveness of the identified instructional methods

In the previous section, this study reported that critiquing research and replicating previous studies are effective instructional methods of teaching research methods

courses. The second objective of this study was to identify theories that explain the effectiveness of the identified instructional methods of teaching research. The document analysis revealed that modelling theory and learning by doing were theories that explain the efficacy of critiquing research and replicating previous research. Apart from being generic theories, the study also found that the theories could also be viewed as instructional methods of teaching research. In this section, these theories-cum-instructional methods are explained.

3.4 Modelling as theory and instructional method of teaching research

Desk research showed that one approach to improve research methods instruction is guided by modelling theory based on imitation. Modelling theory is premised on the view that the behaviour of most human beings is learned through observing others known as modelling. It is through observing others that individuals learn how to perform tasks. In this regard, Rymanowicz (2015) noted that children learn and imitate behaviours by watching and listening to others. This is referred to as "observational learning" when children can learn things simply by observing others. Similarly, through critiquing and replicating previous research, students learn through imitating or modelling the previous work of others. Modelling can, therefore, be viewed as a theory and a research teaching method. Albert Bandura (1965) pioneered learning through modelling with his social learning theory that also referred to as modelling theory in developmental psychology. Modelling theory emphasises the importance of observation and imitation in social learning. Through observation and imitation, most people adapt their behaviour. In many cases, imitation is tempting when the person being observed or imitated is perceived as a role model who is usually admired and whose work and the activities are highly regarded, for example, critiquing and replicating a research paper of a reputable scholar. As time passes, the imitated behaviour is repeated, reinforced and integrated within an individual's behaviour (McLeod, 2016).

The idea of imitation as a learning strategy is also supported by several scholars and theorists. Imitation is usually viewed as low-level, non-cognitive copying behaviour that may inhibit creativity in learning (Warnick, 2008), hence, it is seldom studied in universities. Limited available research focuses mostly on how to avoid copying as a pedagogical approach in academic writing as well as in science classes (Darling, 2001). However, contemporary research in developmental psychology has shown that successful imitation calls for a high level of cognitive ability and is a useful skill distinctive in humans (Meltzoff & Decety, 2003; Meltzoff, 2005). Imitation is usually associated with infants, but it continues to develop during adulthood (Meltzoff & Prinz, 2002). Imitation behaviours in human beings are often related to a range of cognitive capabilities, for instance, communication (Meltzoff & Prinz, 2002). Therefore, it plays an important role in the learning process (Rogers & Williams, 2006). Yet, most scholarly studies on imitation have often focussed mainly on teaching and learning of children ignoring adults such as college and university students. However, recent research has demonstrated that

university students learn equally well through imitation as a springboard to master more complex learning material (Zhou & Guo, 2016). In this regard, Zhou and Guo (2016:22) observed that undergraduate students from different cultural backgrounds "used various imitations in learning and perceived those imitations to have positive effects on their learning".

Based on the foregoing, it has been surmised that critiquing research articles, as well as replicating them, assist students in modelling and imitating the research procedures and strategies used by previous researchers. In the process, students would develop the practical experience of conducting research that would include writing professional research articles. The efficacy of imitation as a social learning strategy has been supported by research. For example, research findings from a study by Zhou and Guo (2016) suggested that undergraduate students reported using imitation in four dimensions of learning which included learning materials, learning activities, problem-solving processes and learning attitudes. The results of the study further revealed that students learned better when using imitations. Furthermore, the major finding that students used imitation in their learning is supported by the findings of previous studies in developmental psychology and that imitation is developed throughout adulthood (Meltzoff & Decety, 2003; Meltzoff, 2005). Concerning specific examples of sources of imitation, the students reported imitating their own previous experiences and others' behaviours, ideas, attitudes and thinking (Warnick, 2008; Cook & Bird, 2011). The research further determined that students reported using imitation as an effective learning tool, as suggested in developmental psychological studies (Rogers & Williams, 2006). Hansen and Genschow (2020: 2) noted that imitation is a ubiquitous part of everybody's life. They further argued that:

> *Individuals tend to automatically imitate a wide range of different behaviors including facial expressions, characteristics of language, emotions, postures, gestures, and simple movements … . Starting already in early childhood and continuing the whole life, observing, and copying the parents' manners, the peers' caprices, or an instructor's demonstrations contribute to one's behavior, for instance by establishing behavioural norms. Imitative behavior has important psychological functions. For instance, in education and training, it enables acquisition of skills and fundamentally contributes to learning … .*

Similarly, when critiquing research, learners are introduced to key concepts such as the statement of the problem, study design, data collection, data analysis and presentation of results. Reading and critiquing high-quality research articles will enhance students' practical research skills. Learning about the various skills involved, such as formulating appropriate research questions, designing and running methodologically sound studies, gaining ethics approval, collecting and analysing data, and sharing results is best done by being actively involved in critiquing and replicating research articles. Learning from the right kind of experience such

as critiquing research has long been recognised as important in achieving an understanding of concepts rather than simply recalling facts (Zhou & Guo, 2016). After critiquing research articles, it was determined that students should conduct research projects based on what they would have critiqued. This means that students can replicate several studies by going through the whole research process including report writing. Finally, the students will then critique their research projects. Doing practical research projects as part of research instruction is premised on John Dewey's (1963) constructivism theory approach to learning by doing and the development of hand-eye coordination in the acquisition of skill and deftness (Warde, 1960). As a strategy to enhance student research skills, Kingston University (2021) urges its academic departments to plan simple research projects for their students.

3.5 Learning by doing as theory and as an instructional method

Learning by doing theory was pioneered by John Dewey, an American philosopher. It is a hands-on approach to learning which means that students should actively participate in the learning process by carrying out practical projects. This is also known as 'constructing knowledge' or constructivism. Bruce and Bloch (2012) define learning by doing as a form of experiential learning whereby learners create a sense of their experiences. In these experiences, students would be actively involved in making artefacts or objects as well as exploring the environment around them. Most importantly, learning by doing is an instructional approach used by teachers to actively engage students in creative and hands-on learning.

In practice, learning by doing is embedded in the contexts of the real world such as laboratory work, internship, problem-solving, use of case studies, project-based learning, and community service learning. Premised on the modelling approach guided by imitation, this paper contends that research methods instruction can be enhanced if students are exposed to previous research articles which they should read and critique and then replicate in groups. Critiquing and replicating research articles would be a form of modelling premised on imitation. According to Gray et al. (2012: 699), critiquing or the appraisal of research is "a systematic, unbiased, careful examination of all aspects of a study to judge the merits, limitations, meaning and significance based on previous research experience and knowledge of the topic". As students critique previous research, they would also suggest strategies to improve future research. Students' suggestions could be incorporated into the studies they would replicate in groups.

3.6 Benefits of critiquing research articles

The last objective was to examine the benefits students derive from critiquing research articles. In this section, more emphasis is applied to critiquing research articles because it is the most critical and antecedent step before the replication and modelling of previous research. Desk research revealed several benefits for critiquing research. For example, Ingham-Broomfield (2014) says that students can benefit from understanding a structured approach to research concerning the

sequences of compiling a research report. Pinkowski (2017) explains how nurses can benefit from critiquing research in the nursing profession. In the same vein, Harris (2006) says that critiquing the research of other scholars is a useful method of scaffolding students' success in research. She further notes that critiquing research helps to communicate research evaluation criteria to students. From the work of Ingham-Broomfield (2014) and Harris (2006), it can be surmised that the benefits of integrating the critiquing of published research articles in research methods instruction are that it:

i. Helps students to understand key components of the research process.
ii. Exposes students to high-quality research reports.
iii. Enhances students' skills in critical thinking and the art of research evaluation.
iv. Exposes students to the best practices in carrying out and reporting research.
v. Exposes students to scholarly academic journals and to understand the process of publishing.
vi. Addresses most of the challenges the students face while writing dissertations.
vii. Shows students how they can convert their dissertations into research articles.
viii. Introduces students to established scholars in their respective fields of study.
ix. Encourages students to participate in practical research inquiry as well as practical dissertation writing.
x. Introduces students to important research terminology.

Critiquing research articles is a useful instructional and learning approach. To operationalise the critiquing process, this study proposes the steps students should take in choosing and critiquing a research article.

3.7 Critiquing a research article as an instructional method

In this section, it is outlined how students can practise the art of critiquing a research article as a self-instructional research strategy.

3.7.1 Choice of an article to critique

To be beneficial to the students, the journal article must be from a reputable journal relevant to the students' programme. The journal article should also have key sections which are approximate to key sections of a dissertation. However, in critiquing research articles, it is also important to choose poor ones but are published in what are perceived to be reputable journals but could be predatory. It was found that students enjoy critiquing research articles that had been written by lecturers and professors. Instructors can deliberately choose such articles to demonstrate that even instructors make mistakes when conducting and reporting research.

The instructor must also choose an article that shows that research was indeed carried out. It is therefore important to distinguish between empirical studies which are original research and articles that simply summarise thinking about a topic or opinion. To make this distinction, McMillan and Wergin (1998) advise the reader to determine the way forward based on the following criteria. If the article meets the following stated criteria, then the article is indeed an empirical study.

i. The title of the article should suggest that data were collected. In most cases, the language used in the title suggests data collection and analysis. Words such as "investigation" and "study" denote that original research was conducted. However, some studies may not contain these words as some scholars may view them as excess baggage or some studies may opt to use other terms.
ii. The article must state the problem that was addressed. The problem could be in the form of a question, hypothesis or purpose of the study. Mere desk research does not fall in this category of a problem.
iii. The article must show where and how data were collected since most research involves the gathering of new data. The section should also summarise the approach used to select subjects who participated in the study and the instrumentation used. Usually, the sampling methods used are also included in this section.
iv. An empirical study should have findings or a results section. Since any study seeks to answer a specific question, there should always be a results section that summarises the data gathered. This section often includes summarised data using tables or graphs.

The University of La Verne (2021) defines an empirical research article as an article that reports research based on actual observations or experiments**.** It further outlines the following guidelines to use to decide if an article is an empirical article.

- Is the article published in an academic, scholarly, or professional journal?
- Does the abstract of the article mention a study, an observation, an analysis, or several participants or subjects? It should also state how the data were collected, for example, through a survey or questionnaire administered, an assessment or measurement used or an interview which was conducted. All of these terms indicate possible methodologies used in empirical research.
- Empirical articles usually contain key sections that include:
  a) Introduction
  b) Methodology
  c) Results
  d) Discussion
  e) Conclusion
  f) References

The foregoing sections may be combined and may have different headings or no headings at all. However, the information that would fall within these sections should be present in an empirical article.

The foregoing are fundamental facets of an empirical study that should be selected for the students to critique as part of their learning process. Once the instructor is certain that the article is indeed an empirical study, the students can use the following guidelines to evaluate the available research reports, first as a class, and later as individual assessments. Students should also be encouraged to identify their own empirical research articles to critique.

3.7.2 The title

A good title should indicate what the whole study is about without being either too long or too short to be informative. It must also indicate the key variables and the relationship between them. Concerning the length of the title, some scholars such as Foster (2018) indicate that it should be about 10–12 words. Journals differ in this viewpoint and adherence to their article guidelines should always take place.

3.7.3 Keywords

All journal articles are expected to list keywords in their articles. These words assist other researchers to identify articles that are relevant to their areas of interest. Therefore, when critiquing research, the reviewer must first assess if the keywords are relevant and informative.

3.7.4 The abstract

An effective research report should have a succinct abstract that summarises the key points of the research report without providing unnecessary detail. A professional abstract usually includes the research problem and the overall purpose of the study; the basic design of the study; major findings of the study, and a summary of conclusions and recommendations.

In general, a good abstract should:

- Explain why the research was conducted.
- Describe how the study was executed.
- Explain what the research sought to accomplish.
- Delineate the findings, conclusions and recommendations of the study.
- Be brief - at most, it is usually about 250 words.

3.7.5 Introduction/Background

This is usually referred to as the introduction or background to the study. Other researchers may simply call it the problem. In this regard, the students should ask the following questions:

i. Is the problem and/or purpose of the study clearly stated?
ii. Does the problem or purpose of the study clearly express a relationship between two or more variables? If so, what is/are the relationship(s)?
iii. Does the problem statement and/or purpose specify the nature of the population being studied?
iv. Has the researcher explicitly stated the significance of the problem?
v. Is the title aligned with the central research problem and research questions?
vi. Does the sequence of statements in the introduction lead directly to the purpose of the study?
vii. Does the introduction or background to the study provide the status quo of the relevant work in the field and does it then identify a knowledge gap that should be filled to solve the problem or to move the field forward?
viii. Does the statement at the end of the introduction clearly spell out the purpose of the study? Other studies state the main focus of the study through research questions, objectives or hypotheses.

3.7.6 Review of literature and theoretical framework

Under the review of literature, in critiquing a research article, the students will be guided by the following questions:

i. Has the researcher included key concepts and/or theories in the article? If yes, what are these concepts and/or theories?
ii. If key concepts are included in the article, which ones are dependent and independent variables?
iii. Are all the concepts or variables clearly defined and operationalised?
iv. Does the literature review make the relationships among the variables explicit? If yes, what is the relationship?
v. Does the article identify the gaps or conflicts in knowledge which the researcher seeks to address?
vi. Has the author cited both primary and secondary sources or are there mostly secondary sources?
vii. What are the operational definitions of the independent and dependent variables? Do they reflect the conceptual definitions?

3.7.7 Research methodology

In interrogating the research methodology, students will be guided by the following questions:

i. What type of research design did the researcher use and did the researcher justify its use?
ii. Is the research design suitable for studying the problem?
iii. How did the researcher collect data and are the data collection procedures clearly explained?
iv. Are the data-collection procedures the same for all participants? If different, does the researcher give reasons for using different protocols?
v. How were the rights of subjects protected?
vi. Is there any evidence that informed consent of the subjects was sought and given?
vii. Are the techniques employed (e.g. documents, interviews, questionnaires, tests) appropriate for collecting the data and are they lucidly delineated?
viii. Does the investigator justify why a particular instrument or tool was chosen and what steps did the researcher take to maintain the accuracy of the instrument?
ix. If the study is qualitative, can the trustworthiness of the study be established, e.g. through assessing the study findings' credibility, confirmability, dependability and transferability?
x. If statistical tests were used, what evidence is presented regarding their rationale, reliability and validity?
xi. Is the statistical treatment of data discussed?
xii. Were appropriate statistical methods used in analysing the data?
xiii. Based on the information provided in the methods section, can the study be replicated?

xiv. Does all the information belong in the methodology section?
xv. Is the method section subdivided for greater clarity?

3.7.8 Results

This section contains a summary of all the data collected and the main results and findings. Here results and findings are viewed as being synonymous. A clear presentation of results will assist the researcher to later make conclusions. If the study is qualitative, many samples of results are expected to be presented in this section. This is usually done verbatim. In a quantitative study, the results usually consist of individual scores or raw data and results are simply presented without discussion or interpretation. Most importantly, data pertaining to each research question, objective or hypothesis should be addressed under the results or findings section. The research critique is guided by the following questions in this section:

i. Are all the research questions/objectives/hypotheses addressed?
ii. Are the findings comprehensibly reported in a textual presentation?
iii. If hypothesis testing was done, was/were the hypotheses supported or not supported?
iv. Are tables and figures appropriately used?
v. Are headings and labels for all tables and illustrations accurate?
vi. Are the data organised for easy comparison and interpretation?
vii. Does the text complement and not simply repeat data in the tables and other illustrations?
viii. Are there any discrepancies in the results between text and tables?
ix. In light of the stated objective(s) and the results, does the study reveal what the researcher intended?

3.7.9 Discussion

Under this section, the students will seek to address the following questions:

i. Does the interpretation of the results arise logically from the data or is it too far-fetched?
ii. Is the researcher interpreting the results or merely repeating these results?
iii. Does the discussion integrate findings with previous research?
iv. Is the interpretation of the findings in the context of the research problem, hypotheses, theoretical framework or literature reviewed?
v. Is the interpretation at odds or in line with other researchers?
vi. Has the researcher considered all the important studies in the discussion?

3.7.10 Conclusions, implications and recommendations

In this section, the main points are summarised and explained. No new information is presented in this section. The researcher can also make suggestions for further research. Key questions that should guide the students include:

i. Does the researcher make any conclusions or generalisations based on the study's findings or does it simply make wild claims?
ii. Are the generalisations within the scope of the findings or beyond the findings?

iii. Does the investigator indicate the possible implications of the study and are these implications meaningful?
iv. Are limitations of the study recognised?
v. Does the researcher offer any suggestions for further research?
vi. What recommendations for future research are stated or implied?
vii. Is a direct application of the research findings possible in terms of resources, effort and ethical considerations?
viii. Would it be possible to replicate the study in another setting?

3.7.11 Overall assessment

In the final analysis, the overall assessment will be based on the following questions:

i. Concerning the journal for which the article is intended, are the topic and format appropriate for the journal and is the article a good fit in meeting the journal's objectives?
ii. Does the abstract accurately summarise the problem, methodology, findings and recommendations?
iii. Is the report subdivided logically into subsections or paragraphs?
iv. Overall, does the author present research logically and clearly?
v. Is the report well-organised?
vi. Is the report well-written?
vii. Are important seminal and contemporary literary sources cited in accordance with the guidelines from the journal as some prefer the Harvard method and others APA?

Critiquing research articles using questions under each of the foregoing sections will assist students to obtain a deeper understanding of the research process. However, to consolidate the learning process, students should be asked to replicate some of the studies they would have critiqued. In this reflection process, students will then critique their research reports in class using the same guidelines. This would blend research modelling, imitation and learning by doing.

4. SUMMARY AND RECOMMENDATIONS

This desk research determined that the lecture method is the major factor contributing to challenges faced by students in conducting their dissertation research. To address these challenges, the study revealed that some scholars recommend critiquing and replicating previous research articles. The efficacy of these two instructional methods can be explained by modelling and learning by doing theories. It was also noted that the modelling theory encompasses imitation. Concerning imitation, while this learning process is criticised, it is crucial as a complementary technique in learning. Hence, the replication of previous research is a useful imitation learning strategy. The article suggests guiding questions that should assist students to critique previous research articles. To ensure that the learning process becomes practical, research methods instructors were urged to give students research project assignments where they replicate the articles they would have critiqued.

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