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MANAGING PLAGIARISM IN DISSERTATIONS: THE APPLICATION OF EPHORUS IN A UNIVERSITY IN ZIMBABWE

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Abstract: *This paper presents an evaluation of the application of Ephorus plagiarism detector in a hundred and thirty dissertations submitted by final year students at masters' level at a university in Zimbabwe. The study was motivated by stakeholders' reactions which varied from a total ban to approval. A descriptive case study using a mixture of qualitative and quantitative methodologies guided the gathering of data from twenty research project supervisors, forty-three students and a test run of a dissertation to establish the contribution of common dissertation preliminaries tot Ephorus' status. Data from supervisors and students was captured by telephone interviews and e-mailed self-reporting questionnaires. The study revealed that, although Ephorus application was a noble move to reduce plagiarism, its' application require improvements. The current application of Ephorus at the end, when dissertations have been marked renders it more of a witch hunting device than a dissertation quality and originality improvement tool. The majority of supervisors and students had limited knowledge of how Ephorus works. Bailey (2011) objected to the use of anti-plagiarism software because they don't detect plagiarism but sections of identical texts. Participants recommended that, Ephorus be applied by dissertation supervisors within the supervision process as a learning enhancement tool. This study recommends that: (a) the university mounts anti-plagiarism software awareness workshops for all lecturers. These can cascade from top (Deans) to bottom (Teaching Assistance). (b) All lecturers be trained to use it with trial runs done on dummy assignments in which plagiarized; sentences, paragraphs and ideas are included. Stress can be placed on the role of the lecturer in deciding whether plagiarism has been done or not. (c) Students should be informed of its' application. (d) At masters' level, the plagiarism report should be discussed with the student as a remedial teaching tool.*

Key Words: *Managing plagiarism, dissertations, Ephorus, University*

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INTRODUCTION

There is a marked increase in the number of universities in Zimbabwe. The majority of them have also started offering degree programmes at masters' level. According to Nherera (2002) the university providing the contextual case opened its doors as a university of technology in the year 2000. Its mandate includes technology, innovation and wealthy creation. The critical words in this mandate are innovation and creation. Not imitation or duplication. The products of research and teaching from this university are expected to be original or bringing in a new angle as part of the value addition. Since the case is a university of technology, it is equipped with both wireless (Wifi) and Local area network (LAN) internet facilities. Such developments facilitate students' access to the global village where they are attempted to plagiarize. For example, Cryer (2006:89) reported that, there are students who buy essays, theses and dissertations on the internet. This violates the spirit of innovation and creation required at a university of technology or in research as a discipline. Insuring that students develop originality starts by discouraging them from plagiarizing essays and dissertations. This is a difficult task for supervisors and lecturers to carry out manually, hence the need for applying plagiarism detecting software like Ephorus.

Ephorus is a Germany company which offers anti-plagiarism software to teachers. In this study, the word Ephorus refers to the anti-plagiarism software itself. We need a visit to Ephorus Plagiarism Control Manual (2013) to get an understanding of what Ephorus is, what it can and cannot do it terms of plagiarism detection.

According to Ephorus Plagiarism Control Manual (2013: 3), Ephorus compares students' literal work with literal work on the Internet, libraries and other documents submitted to the same institution and was send for Ephorus plagiarism detection. It uncovers suspect assignments and reports to the teacher. The student can get the plagiarism report from the teacher. As a result, the Germany company Ephorus only provides its' plagiarism detection software to teachers. Such a mode of operation raises suspicion from students. In this case Ephorus is used as a witch hunting device not a teaching and quality control instrument.

Ephorus report to the teacher has basically two columns. One showing the status of the student's scanned assignment, theses or dissertation and the explanation. The table below adopted from Ephorus Plagiarism Control Manual (2013: 7) shows the example.

Script Status	Explanation
OK	No sign of plagiarism was found (0% to 5% matches)
Match	The assignment is possibly plagiarized (0% to 30% matches)
Match	Signs of plagiarism are discovered (30% to 100% matches)

A completed plagiarism status of say 69% matches, means that Ephorus has found a 69% matches with one or more texts. Users should take note that, Ephorus found matches not plagiarism rate or plagiarism status of 69%. During the application of Ephorus in this study, dissertation which got a script status above 20% matches, were regarded as unacceptable plagiarism. The students whose dissertations were in that category were failed although they were signs of plagiarism and not a quantification of plagiarism in the dissertation.

Ephorus Plagiarism Control Manual (2013: 3) stress that, the teacher is supposed to compare the matches between the student's work and that provided on Ephorus report and decide whether the work was plagiarized or is an error in referencing. It is very important to note that, the teacher has a very important role in deciding whether plagiarism was done or not. Ephorus in this case, only identifies and matches identical or similar words and does not pronounce plagiarism. This is a critical fact that those who apply Ephorus need to know. Anti-plagiarism software does not pass plagiarism verdicts on assignments, theses or dissertations. It is the teachers' role of passing verdict on plagiarism after scrutinizing the student's work and the matches provided by Ephorus. This was missed in the application of Ephorus in this case study.

Ephorus Plagiarism Control Manual (2013: 4) clearly spelt out that, Ephorus detects well similar text-based documents. It has problems with assignments involving mathematical formulas. One can conclude that, students who plagiarized dissertations in which hypothesis testing and regression analysis was applied got away with undetected plagiarism. This suspicion motivated the generation of a hypothesis of association between study methodology and Ephorus status.

The point is that, Ephorus places the teacher on the judge's chair for the determination of plagiarism. The teacher "has to decide whether the detected matches are truly a case of plagiarism or whether a learner has not quoted a text properly or the two different texts simply happen to coincide" (Ephorus Plagiarism Control Manual, 2013: 4). The teacher's role

in assessing plagiarism in assignments, theses and dissertations, require an understanding of plagiarism itself.

Plagiarism can be defined from various perceptions. Rodrigdes and Rodrigues (2000: 108) pointed out that, "If you use someone's words without giving that person credit, you are guilty of plagiarism." So the use of another's words is plagiarism. This definition does not care whether one is using another's words from oral conversations or written form. Moreover it is not clear how many words constitute plagiarism. This definition also attaches an offence to the omission of crediting the owner of the words. It assumed that, readers are aware of how the owner is credited. The word guilty, emphasizes that the omission of credit is illegal in the academic world.

Cryer (2006) considers plagiarism as a form of fraud and malpractice. In this case, fraud portrays the idea of taking what is not legally yours. In fraud, the emphasis is on disadvantaging the owner of the words by diverting them to your own use as your own. In research, the owner is disadvantaged by lack of credit pointed out by Rodrigdes and Rodrigues (2000). Besides, Cryer (2006:89) clarifies plagiarism as taking the written work of others and passing it off as one's own. This excludes the oral perhaps due to lack of evidence of ownership.

From an academic view point, Mach (2013:1) considers plagiarism as, "presenting the intellectual work of another author borrowed or imitated in whole or in part, as a person's own." These concepts are loud and clear on the need to indicate the author of the borrowed words or ideas. In fact Cryer (2006) pointed out that, it is not plagiarism to quote short passages, provided that one points at the source. For instance, Gary (2011:58) claimed that one is permitted to copy around 400 words from an author as long as the one copying makes full and clear attribution to the author in question." These conceptions of plagiarism converge to the conclusion that, one is not guilty of plagiarism when one acknowledges the sources.

According to Ephorus Plagiarism Control Manual (2013:3), "plagiarism is the act of appropriating the literary composition of another author, or excerpts, ideas or passages and passing the material off as one's own creation without quoting sources." While this document acknowledges that, plagiarism is committed when sources are not quoted, the words "literary composition" excludes the oral utterances. Cryer (2006) and Ephorus

Plagiarism Control Manual (2013) concur and anchor plagiarism on the "passing" of someone's work to others "as yours." Reading in between lines, one can discern that, for plagiarism to exist, there must be a change of words, sentences and ideas ownership. Using this indicator implies that, students will be guilt of plagiarism if they pass other people's work for marking as theirs. This can include copying of assignments.

Focusing specifically on students, Gary (2011: 58) affirms that plagiarism is, "the submission for formal assessment of an assignment that incorporates without proper citation or acknowledgement by means of an accepted referencing standard, the intellectual property or work of a third party." If the work is submitted for formal assessment, sure one is guilty of intellectual misrepresentation. The intellectual credit awarded can not be that of the person presenting the work. That presents a direct threat to the validity and reliability of university qualifications. One can infer that, plagiarism is not desired because it is a lie. The one presenting another's work as his/hers will be lying to those reading or receiving the information.

Although Gary (2011:58) admits using copy and paste for notes, the author justified it as a way of ensuring that the notes are accurate. In any case Gary (2011) did not pass or submit the downloaded notes to anyone, hence may not be guilty of plagiarism. Hart (2005:71) scornfully acknowledges that Bettelheim (1976) gained fame by plagiarizing the work of another. These two cases leave students wondering why they should be discouraged from plagiarism when others did it so successfully.

Gary (2011:58) discourages plagiarism for the following reasons:

1. It is against the spirit of learning, development and improvement.
2. There is the risk of being caught and penalized.
3. Researchers are allowed to use other authors' work as long as they are acknowledged. Hence there is no need for stealing what you are permitted to get.
4. Referencing is evidence of wide reading. It should be done to gain credit and not plagiarism scorn.
5. It is an ethical issue to apply acceptable references.

Satisfying accepted referencing standard may be trick. It may imply that, if one fails to reference using the Harvard or American Psychological Association (APA) styles, then anti-plagiarism software like Ephorus will find that person guilty of plagiarism and not failure to

reference. This is a rich field for debate on the application of anti-plagiarism software in dissertations at university level. For this reason it is important to consider other studies on the application of plagiarism detecting software.

In a study aimed to test the effectiveness of four plagiarism detecting software, Mach (2013:7) used a dummy document in which a single sentence or single paragraph copied from another source document was the included indicator. Mach (ibid) compared Thesis, Tumitin, Ephorus and Google Plagiarism detector software. Mach's (2013: 7) findings are copied in table 2, below.

	Anti- Plagiarism Software				
Plagiarized Form	**Thesis**	**Tumitin**	**Ephorus**	**Google Plagiarism**	**Average**
Sentence	12%	40%	2%	56%	28%
Paragraph	14%	42%	6%	46%	27%

These findings show that, none of the tested systems was able to perfectly detect the source of the plagiarized sentence or paragraph. The Tumitin and Google were better at detecting copied sentences or paragraphs. The Thesis was ranked worse and Ephorus the worst. It found the minimum of documents indicating plagiarism. The university in this study applied Ephorus on the understanding that, it detects the minimum hence ideal for a start.

Literature raises contradicting views on the application of plagiarism detectors. Ephorus Plagiarism Control Manual (2013:9) points out that, Ephorus cannot tell whether learners have quoted a text correctly and used proper referencing techniques or whether they have plagiarized it. Bailey (2011) raised interesting points to support his/her objection to a blind implementation of plagiarism detectors. The key word "blind" needs qualification. First is the point that, plagiarism detectors do not actually detect plagiarism. They detect sections of identical texts. Their use is tantamount to the use of a wrong tool for evaluation which contradicts theories of educational measurement and evaluation. Plagiarism detectors only tell that, X's text is identical or similar to the one authored Y. Not that X has plagiarized Y's work. Second is that, plagiarism detectors do not analyze content but words, hence they cannot detect plagiarized ideas, redrafted texts and translations. This situation requires an evaluation of the application of Ephorus plagiarism control to reduce problems that it may raise.

STATEMENT OF THE RESEARCH PROBLEM

The application of Ephorus plagiarism software for the first time in a university in Zimbabwe, on dissertations submitted by students at masters' level raised controversial academic debates by those for it and those against it. Literature on plagiarism has covered forms of plagiarism (Gray, 2009:543), detecting methods and strategies (Walliman, 2005:336, Cryer, 2006: 89) not much has been done on the evaluation of the application of anti-plagiarism software in a university set up. There is need for the evaluation of the implementation of Ephorus for accountability, provision of feedback to stakeholders (Ephorus the company, lecturers as users and students the affected population) and improvement of the application process.

RESEARCH QUESTIONS

The main objective of this study is to evaluate the application of an intervention (Ephorus plagiarism control software) on students' dissertations. Specifically the study seeks to answer the following questions:

1. How was Ephorus plagiarism control software applied in the case university?
2. What were the weaknesses of the application process?
3. How can a university apply Ephorus as a teaching instrument to enhance the quality of dissertation originality?

HYPOTHESIS

The fact that, Ephorus has problems with assignments involving mathematical formulas (Ephorus Plagiarism Control Manual, 2013: 4) motivated the formation of the hypothesis:

H_0: There is no association between dissertation methodology and Ephorus dissertation Status.

H_1: There is an association between dissertation methodology and Ephorus dissertation status.

The realization that, there were plagiarized sources indicated as originating from the case university when the university was applying Ephorus for the first time, lead to the formulation of the following hypothesis:

The common dissertation preliminaries are on contributing significantly to Ephorus Status.

Symbolically; H_0: $\overline{d} = 0$

Alternatively; H_1: $\overline{d} \neq 0$ (two –tailed t-test)

STUDY METHODOLOGY

Research Design

The study topic is concerned with understanding a social phenomena (application of an intervention, Ephorus) from participants' perspectives, hence guided by a mixture of qualitative and quantitative approaches (White, 2005:80). In fact, an evaluation of an intervention such as the application of Ephorus software requires reality constructed by the researcher and affected participants. Neuman (1997) called it a subjective multiple reality. The study applied a qualitative case study research design. It is a case, in that it is bounded and limited to one university and a single concept of evaluating the application of one intervention (Ephorus).

According to Gay (1978) and Anderson (1995) an evaluation of an intervention done at the end, require the guidance of the Goal Free model proposed by Scriven in 1976. The Goal free model allows evaluators to assess the actual outcomes or effects of the intervention. It considers both the intended and unintended outcomes. As a result, multiple methods are called for. Fortunately, Nyawaranda (2003:6) proposed that, a qualitative study does not require a formal research design. A detailed research method will suffice because it is naturalistic, practical and full of the unexpected. The fluid nature of qualitative research design allows researchers to apply the most appropriate methods for the data. In this case it allowed the researcher to carry out hypothesis tests which are normally confined to quantitative methodologies. This application of numerical analysis in qualitative studies was approved by Chisaka (2001) who suggested that, the best method should be used to extract the most from any study, regardless of the traditional boundaries of qualitative or quantitative methodologies. This research design freedom allowed the researcher to use open ended questions which solicit individual views. Triangulation of source and methods enhanced the validity and reliability of findings.

Population and Sampling

The population of this study is composed of lecturers who supervised masters' students, students whose dissertations were scanned and the dissertations which were scanned for plagiarism using Ephorus. Project supervisors are important stakeholders whose contributions to the university policy on the management of plagiarism influence the

application of that policy. The students contribute the affected population's views. Both lecturers and students are rich sources of alternative ways of managing plagiarism in universities.

Purposive sampling was applied to select the 20 research project supervisors and 43 students who responded to the self-reporting questionnaire. They qualified to participate in this study by virtue of being research project supervisors who supervised and marked and passed research projects some of which were failed because they had a Ephorus report indicating a march greater than 20%. These were considered rich sources of the evaluation information required by the study. They were available, contactable on e-mail and willing to participate. Dissertations provided the sources of Ephorus matches.

Instruments

Two major instruments were used in this study. The self-reporting questionnaire asked for participants' views on the application of Ephorus plagiarism control and strategies to manage plagiarism in dissertations. Dissertations revealed matches identified by Ephorus. Two of them were used to check on the accuracy and sources of matches indicated by Ephorus.

A self-reporting questionnaire e-mailed was ideal for this study. The researcher considered that, lecturers and masters' students were literate and able to record their views. Individual views were required and participants were able to submit them at their own time. A folder was easy to create for the safety of the responses. The majority of them have e-mail addresses which the researcher got from the registrar's office.

Data Collection and Analysis

Data collection for this study started by informal interviews with lecturers to gather information on how the dissertations were supervised, marked and Ephorus plagiarism software applied to establish the current plagiarism management process. This was followed by desk research to have better understanding of plagiarism and the use of anti-plagiarism software. Literature helped the researcher to focus the study on the application which is a human activity that can be improved by training interventions. The study became a needs analysis as well as contributing to the solution of a problem. The informal interviews and desk research provided the frame for the questionnaire which was structured by the researcher and e-mailed to the sampled participants.

During an analysis of Ephorus Status reports, the researcher noted that, there were plagiarized sources indicated as originating from the university itself. This puzzled the researcher since this was the first time Ephorus was applied. To investigate this problem, the researcher carried out plagiarism checks on seven dissertations before and after removing common preliminaries such as the common front page, declaration form, dedication, letter on introduction and other forms provided by the university to test their contribution to the matches identified by Ephorus. A hypothesis test for effectiveness was carried out to find if these common preliminaries contributed significantly to Ephorus dissertation status.

Data analysis was done by identifying emerging themes such as current plagiarism management process, weaknesses of the process and suggestions for managing plagiarism in dissertations. A hypothesis of association was tested using the Chi-Square test of association at 5% level of significance. The Chi-Square test statistic was considered appropriate since the data is categorized and variables given in frequencies. Letters are used to identify participants and protect them as required by research ethics. Findings are presented in the next paragraphs.

STUDY FINDINGS AND DISCUSSIONS

Current Plagiarism Management process

The study found that, there was no formal process for the detection of plagiarism in dissertation submitted for marking. Students selected dissertation supervisors according to their study area. For example, any student who had an interest in education and educational management was allocated to a Mr. Chinamasa because Mr. Chinamasa is a teacher and educational manager by profession and experience. One understood it to mean that, such students were receiving the best guidance from a professional practicing supervisor.

How students and their supervisors interacted was entirely their own arrangement. They did what was convenient to them. In some cases, students submitted hard copies of each chapter. The supervisor marked and discussed with the student. Some supervisors asked students to e-mail them each completed chapter, they marked on line and returned the marked chapter to the student. One supervisor used group supervision. The students under his supervision came to the university on agreed days, presented each chapter, received

feed back from the group and proceeded. Both the student and supervisor were required to sign a supervision form which was intended to be an internal monitoring device.

At the end, each student submitted three copies of the dissertation to the supervisor who would sign to acknowledge that he/she supervised the student. The supervisor marked one of the dissertations and forwarded the other two copies to the department. The second copy was marked by an independent marker selected by the administrator. This was intended to check on the quality of the dissertations and a cross-fertilization process for the supervisors. The administrator compared the mark from the supervisor and that of the independent marker. If a difference of 10 marks arose, them the third copy was given to another independent marker for a final opinion. If the difference was within 10 marks, then the average of the two marks was awarded to the student. The assumption in this process was that, the supervisor and markers are experts in their fields and can detect any plagiarized work.

For the 2013 group being studied, the whole process was done. After the dissertations were marked, only those which had been passed were submitted for Ephorus plagiarism test. The university got one person who had knowledge of the application of Ephorus to apply the software on the dissertations. Those dissertations whose reports revealed more than 20% matches were failed as plagiarized dissertations. The table below shows the profiles of five such dissertations.

Dissertation	Supervisor Mark	Examiner Mark	Average Mark	Decision	Ephorus Plagiarism Status	Final Decision
B	65%	72%	69%	Pass	41%	Fail
C	78%	70%	74%	Pass	32%	Fail
D	54%	60%	57%	Pass	27%	Fail
E	66%	56%	61%	Pass	30%	Fail
F	58%	56%	57%	Pass	36%	Fail

These findings show that, Ephorus plagiarism match did override decisions by university examinations board. No lecturer was involved in scrutinizing the matches provided by Ephorus detector and the student's work to decide whether it was a real case of plagiarism or an error in referencing or a case of similarity. This omission of the teacher's role in the

application of Ephorus confirmed limited knowledge of it by lecturers. Actually, responses from self-reporting questionnaires revealed that, only three out of the twenty respondents had an idea of what Ephorus was and what it did. The rest reported ignorance and indicated the need to participate in training on, what Ephorus is and how it is used.

The omission of the teacher's role contradicted one of the critical requirements by Ephorus Plagiarism Control Manual (2013:9) and Bailey (2011), who required that the teacher matches student's script to the match provided by Ephorus and pass the judgment of plagiarism or not. These findings support Bailey's (2011) conclusion which points out that, leaving the final judgment on plagiarism to machines does not work. A lot of people will be accused of plagiarism falsely. The none involvement of lecturers and students in the process contributed to their objection to its use and considering it as a witch hunting device rather than a dissertation quality control means.

Hypothesis Test of Association

An analysis of the 130 dissertations submitted for Ephorus plagiarism test, their research methodologies and Ephorus Status is shown in the following contingent table for association. The table shows observed frequencies and expected frequencies in brackets.

	Ephorus Dissertation Status		
Methodology	Below 20% (Passed)	Above 20% (Failed)	Total
Qualitative	19 (27.7)	31 (22.3)	50
Quantitative	33 (23.8)	10 (19.2)	43
Mixed	20 (20.5)	17 (16.5)	37
Totals	72	58	130

At 5% level of significance, v = 3 D.F. the Chi-Square critical value is 7.815. The Chi-Square calculated test statistic value is 14.12. Since Chi-Square critical value =7.815 < Chi-Square critical value = 7.815. There was no sufficient evidence to support the null hypothesis (H_0). The study concluded that, Ephorus Dissertation Status was associated with the methodology applied by the researcher. The majority of those who used text rich descriptions required by qualitative methodologies suffered more than those using mathematical formulas in the quantitative and mixed methods. Findings support, Ephorus Plagiarism Control Manual

(2013: 4) which clearly spelt out that, Ephorus detects well similar text-based documents. It has problems with assignments involving mathematical formulas.

Although it was not considered, the implication of this finding is that, students who used quantitative and mixed methods got away with a lesser Ephorus Dissertation status and passed than they actually deserved because of the use of mathematical formulas and mathematical symbolic language.

Hypothesis Test for the contribution of common preliminaries

The table shows Ephorus Dissertation Status before and after removal of common dissertation preliminaries pages

Dissertation	J	K	L	M	N	O	P	Q
Number of Pages Removed	9	5	4	6	4	8	7	5
Status Before	41%	37%	17%	52%	61%	26%	34%	29%
Status After	24%	18%	9%	41%	56%	15%	20%	17%
Differences (d)	17	19	8	11	5	11	14	12

The findings in the table show that, common removing of preliminary pages reduced Ephorus dissertation status. All the dissertations had a lower Ephorus status after the removal of common preliminary pages. It is very disappointing to note that, dissertations: K, O, P and Q would have passed if they were assessed for plagiarism with the common preliminary pages removed. Because this was not done, these candidates failed the dissertation when they were supposed to pass. The error is not the application process not Ephorus the software.

An analysis of the differences showed that:

Its' standard deviation, S_d = 4.55, $\bar{d}$ = 12.13, $\sqrt{n}$ = 2.83 and Calculated test statistic, $t_{calculated}$ = 7.54.

At 5% level of significance, v = 7 D.F. two-tailed test, the critical value, $t_{critical}$ = 2.365.

Since , $t_{critical}$ = 2.365 < $t_{calculated}$ = 7.54. There was no evidence to support the null hypothesis. The study concluded that, the common dissertation preliminaries contributed significantly to the Ephorus dissertation status. This study strongly recommends the removal of the

common dissertation preliminaries before Ephorus plagiarism control software is applied. They are common text material and considered by Ephorus as plagiarized matches.

RECOMMENDATIONS

On the basis of these findings, this study recommends the following:

(a) The university mounts anti-plagiarism software awareness workshops for all lecturers. These can cascade from top (Deans) to bottom (Teaching Assistance). They should include all types not only Ephorus.

(b) All lecturers be trained to use anti-plagiarism software. Trial runs done on dummy assignments in which plagiarized; sentences, paragraphs and ideas are included can be effective for the understanding of what they are capable and not capable of doing. Stress can be placed on the role of the lecturer in deciding whether plagiarism has been done or not. This calls also for a through revisit of in-text citation and referencing formats.

(c) Students should be informed of its' application.

(d) Lectures should apply anti-plagiarism software on all assignments, dissertations and theses. At masters' level, the plagiarism report should be discussed with the student as a remedial teaching tool.

(e) When applied to check on plagiarism on dissertations and theses all common university preliminaries must be removed.

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