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Learner errors related to linear equations in grade 10

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CORRECTIONS

Name: PSM Tebeila

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Original page no.	New page no.	Correction required	Action taken
This is the page no. in the first submission	In the final version the page number may have changed which is why it's important to have this column	Indicate what the examiner wanted corrected/inserted/etc/	Say what you did, e.g. "corrected", changed sentence as follows: … Etc.

Original page number	New page no.	Correction required	Action taken
Examiner 1: main comments		A concern was raised about more clarity about signifiers and in what sense that is used in the research	An example of errors of signifiers was x(x - 2) = 8 becomes x = 8 or (x - 2) = 8 on page 13. In this example a wrong signifier of eight is used. On page 13 an addition of "Objects and signifiers will be used interchangeably in this study" is done,
		Inconsistency for marking as seen in 4.3.6 where the mark is one, although earlier three marks was mentioned.	"It has to be mentioned that 1 is not a mark but is a code" has been added to show the difference between 1 as a mark and 1 as a code. Codes have been darkened to differentiate them from marks.
		Proofreading, references in the body needing to be on the reference list, and page breaks were found to be requiring attention.	Proofreading, references and page breaks were given attention throughout the
Examiner 2: Main comments		The a researcher should be careful to acknowledge other possibilities when discussing possible reasons for errors.	A statement about errors which could not be matched with routine errors, visual mediator

			errors and signifier errors was added, page 39 A statement about errors not being easily matched was added page 42 Clarity was provided by relating errors to deviations page 51
		Taking care in reporting on small variations, Showing complexity of awareness of the transition process	The notion that small percentages like in Q2 should not be seen as significant was added on page 45. A foregrounding note was added A sentence has been added to indicate that change if any will be gradual on page 23
Original page number	New page no.	Correction required	Action taken
Page 7	Page 8	The examiner felt that is readable, but not very good enough to convey the meaning.	The sentence has been changed to convey better meaning "stem from errors in basic algebra has been removed as this study is not about basic algebra
Page 10	Page 10	The study problem was to identify and categorize the errors in learners' manipulation of linear equations so necessary adjustments were needed here to include that.	The study problem has been changed to emphasise the fact that identifying and categorising errors is important in this study.
Page 10	Page 10	The examiner what more information about what "changes" are all about.	The statement has been changed to stress the fact that it is changes in the errors made and not changes in performance that matters in the study.
Page 10-11	Page 14	The discussion on representational, transformational, generalising and justifying activities needs to be replaced.	The discussion on representational, transformational, generalising and justifying activities has been made part of literature review. This is the new 2.3

Page 14	Page 12	What makes it an error, rather than just an endorsed narrative?	Further clarity about errors is now given.
Page 15	Page 13	More information about conjoining is needed.	Further conjoining explanation is given.
Page 15	Page 13	A question about how exploratory tools are provided for by commognition, and how their interpretation will be done was raised.	A sentence about how analysis will be done is added.
Page 15	Page 13	signifiers	"Signifiers" has been changed to "errors of signifiers".
Page 15	Page 13	"Social interaction will not be given attention here".The fact that the quote is. a weakness of the discursive account for this research was raised.	A weakness of the discursive account is added.
Page 16	Page 15	not understanding arithmetic concepts. need to express this in terms of something other than 'concepts' was raised.	An explanation of what is meant by not understanding arithmetic concepts is done.
Page 17	Page 15	More information about commognition is needed.	An explanation about how commognition will be used is given.
Page 17	Page 15	inputs about	"Input about" is changed to "about" for better clarity.
Page 18	Page 16	Is n an answer or a parameter here?	The roles played by n and 2n are better clarified.

Page 21	Page 18	"That exercise" was found to be unclear	"That" replaces "That exercise" for better clarity.
Page 22	Page 19	2	"4" replaces "2" as it is 4 that moves.
Page 26	Page 23	The complaint was that the chapter needs to start on a new page.	The chapter now starts on a new page.
"Page 26	Page 23	The examiner was not sure how the method will be informed by learner achievement	"learner achievement" is replaced by "learner three kinds of errors" for better clarity.
Page 27	Page 23	The notion that change if any happens gradually was raised.	A sentence has been added to indicate that change if any will be gradual.

Page 27	Page 23	'The study was conducted in two methods - qualitatively and quantitatively". The issue raised was these are much bigger than 'methods'	A sentence has been included to emphasise the fact that there is more to the study than qualitative and quantitative analysis.
Page 28	Page 23	In this study the responses were sorted, into three possible categories of errors: errors as routines, errors of visual mediators and errors of signifiers	A sentence explaining how learner responses were analysed was added
Page 28	Page 24	occurs	"May occur" replaces "occur" for better clarity.
Page 28	Page 24	"Change occurs due to treatment/interventions" was found to be inadequate.	A sentence is added to stress that much more work is needed in order to boost reliability.
Page 31	Page 26	Only the fact that the questions were representational was emphasised by the research report.	The fact that the questions are also transformational was added.
Page 32	Page 27	factoring out the minus sign	" factoring out a factor of -1" replaces "factoring out the minus sign" for better clarity.
Page 33	Page 28	Information about categories was found to be insufficient.	A statement about categories mentioned by Brodie and Berger is added for better clarity.
Page 35	Page 29	A concern was raised that it is the analysis that matters and not the test	The fact that the validity of the analysis is done and not the validity of the test is emphasised.
Page 35	Page 30	"Reliability" was found to be insufficient	"reliability of the research analysis" replaces "reliability" for better clarity.
Page 38	Page 32	"discursive approach used to investigate the errors made" was found to needing more information..	More explanation of the discursive approach is given
Page 39	Page 32	get	"got" replaces "get" to report in the past.
Page 39	Page 32	leave	"leave" becomes "left" to report in the past.
Page 39	Page 32	The statement "old habits of solving problems disappear and moving towards a new discourse happens without hindrance" was found not to be supported.	The sentence about old habits is left out as there is no sufficient data about the statement.
Page 39	Page 32	"This was to help support the literature findings about the shift from arithmetic to basic algebra	The statement is removed to avoid pre-judging the study.

		not being without hindrances" was found to be pre-judging the study.	
Page 40	Page 33	multiplication	Replace "multiplication" with "substitution"
Page 43	Page 35	"Mamelodi" was found to be compromising confidentiality of the study.	The name of a place is removed to enhance confidentiality.
Page 43	Page 35	But did the teacher see the codes allocated by the researcher when doing the re-coding. If so, there could still be a problem because this could cause an expectation of how the teacher was 'expected' to code.	A statement about the teacher not seeing the codes of the researcher is added to emphasize that he was not influenced.
Page 44	Page 37	"The average mark was obtained in the usual way of adding all the marks and dividing by the frequency. The reason for the choice of average mark was that taking each individual mark for comparison between the pre-test and post-test would yield the same results. However individual marks will be considered when deeper analysis of errors is done" was found to be unclear.	Unclear statements about the average mark were removed.
Page 45	Page 37	"The post-test average is more than 50% the mark for the question" was found to be requiring an addition.	The notion that small percentages like in Q2 should not be seen as significant was added.
Page 46	Page 39	The least increases were in Q5 (a), Q5 (b) and Q5 (c) where the increases were respectively 18%', 22% and 1%.	The notion that the least increases were in Q2 and Q3 were added.
Page 46	Page 38	Claims were not found to be foregrounded.	Justification for an error analysis that includes factorisation was done.
Page 46	Page 38	Better justification for codes was sought.	Justification for codes that includes basic skills in arithmetic is done.
Page 47	Page 40	"Examples here are $3b - c = (3b - c)(c - 3)$ which was made by learner 29 and $a + 2c = 2c + 2c$ was made by learner 32". More details were needed.	A statement about errors which could not be matched with routine errors, visual mediator errors and signifier errors was added.
Page 48	Page 40	"poor performance" was found to be a problem.	"Poor performance" is replaced with "common question responses" for better clarity.
Page 49	Page 42	"0 = there is no response. These will be regarded as and are useful in enabling an analysis to	The statement is made clearer by removing too much wording.

		include the fact that blanks could be left in some questions and that nothing new written by the learners. This question code was informed by progress or lack of that in the shift from pre-test to post-test and also hopefully, from arithmetic to basic algebra, was also used as mentioned latter in the conclusion of the method chapter. No response errors were be called blanks." Was found to be confusing.	
Page 49	Page 42	could not be	"were not" replaces "could not be" for better clarity.
Page 49	Page 42	The reasoning/ discourse usage that led to these errors could not be inferred convincingly using the developed codes??	A statement about errors not being easily matched was added.
Page 49	Page 42	The issue raised about "were accommodated as usually after two errors there is no chance of getting a sum right" was that the chance of a correct response is not really important here. The examiner would have expected a reason based on the observation that few responses had more than 3 errors, or that after 3 errors, the interpretation of remaining errors became much more uncertain.	The fact that after two errors the interpretation of errors became much more uncertain was added.
Page 50	Page 44	"These rows are high because of the contributions made by question 5 errors. The implication is that question 5 contributes substantially to routine errors" was.	The statement was removed for better clarity.
Page 50	Page 44	Each question contributes substantially to at least one of these 4 routine errors. So this does not justify the last sentence. Q5 contributes substantially to 3 of the four (but not really to Rf).	The fact that each question contributes substantially to at least one of these 4 routine errors was added
Page 51	Page 46	"Question 5 is almost the last in terms of signifiers and visual mediator errors" was found to be a problem as the numbers here are so small that comparing Q2, Q3 and Q5 is not significant.	Unclear statement was removed.
Page 52	Page 45	"Routine multiplication yielded more errors than any other category and that shows that errors related to multiplication and division are the main contributors to errors that were made when answering all four questions. As these questions are related to solving equations it can be concluded that multiplication errors contribute substantially to errors that are made when solving equations" was found to be confusing..	The unclear statement was removed.

Page 53-54	Page 47	"Question 5 has almost the least number of signifier errors 54 and visual mediator errors because of the nature of the questions selected" was found to be confusing.	The unclear statement was removed.
Page 54	Page 47	"The last row shows that Question 5 which was based on equations as looked at in this research had the most number of errors due to blanks and can't explain errors. That suggests that the skill tested in the question, impacts negatively on the mastery of equations. This does not come as a surprise as errors related to routine factorization, routine addition and routine multiplication collectively contribute to Question 5 being found to be challenging. Question 2 which was based on multiplication had the least number of the sum of errors in this group of categories" was found to be unclear.	The unclear statement on the left was made clearer.
Page 54	Page 48	**4.10.3 Comparison between routine errors and other errors** The fact that routine errors had a total of 369 and the group of all other errors had a total of 146 means that routine errors contributed mostly to unsatisfactory performance as routine errors are more prevalent. That means that insufficient communication that employs routine categories leads to learners not being skilful at solving equations.	The heading was changed to **4.6.3 Routine errors**
Page 55	Page 49	The number of substitution errors and arithmetic errors instead increases. Increasing substitution errors could be linked with the fact that there is no single learner who was seen to be checking answers by substitution and that means that the discourse that is related to working with substitution is not enhanced. The mere fact that arithmetic errors are increasing from pre-test to post-test means that extent to which errors made by grade 10 learners when dealing with linear equations stem from errors in arithmetic is substantial.	The statement was removed
Page 56	Page 51	To a lesser extent, substitution rules and reducing an expression with two terms to one term, as endorsed by learners, also contribute to deviations from the real mathematical discourse. These enacted rules as endorsed by learners are not necessarily the same for the 45 learners.	Made clearer by relating errors to deviations.

		The rules endorsed by the learners are not the same as they do not make exactly the same mistakes. The example is others would write 2c to be 2 + c and others to be 2c.	
Page 58	Page 52	What makes the solutions different is that a question that was done without errors in the pre- but became a challenge in the post-test. It became a challenge as the solution in the post-test is not correct.	A statement about the order of operations is was added.