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# Back to basics: A role of reading, writing, and arithmetic teaching

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This study has assessed the role of reading, writing, and arithmetic teaching among adult learners in Saudi Arabia. A quantitative approach was used by recruiting 186 students divided into three groups, namely, the write to learn (WTL) group, traditional teaching group, and individual technology use (ITU) group. Statistical Package for Social Sciences (SPSS) was used for the analysis of the arithmetic and literacy test scores of the students. The findings showed that the performance of the WTL group was most effective among the three groups. The results showed that the learning capacity of adults could be improved by refining their writing and reading skills. The formative feedback, collaborative environment, and engagement helped improve the learning scores. It shows that the use of information and communication technology (ICT) should be accurately implemented along with the formation of a collaborative environment.

## KEYWORDS

arithmetic, collaborative learning, ICT, formative feedback/assessment, reading, writing

## Introduction

Teaching plays an important role in enhancing the capabilities of learners to achieve their goals and objectives in academic settings. The foundation is laid by the teachers based on the academic tasks of learners; therefore, the teachers must be aware of the students' characters (Smith, 2017). Reading and writing multiple texts on similar topics are helpful for adults to recognize words within the texts with adequate speed and accuracy (Bråten et al., 2013). Writing during the arithmetic learning deepens the learning of the students and helps them to gain new perspectives. According to the National Institute for Literacy (2007), proper instructions and practices are required for learning to write well. Pugalee (2004) revealed that there is a positive impact of writing on arithmetic problem solving as it helps to organize and describe the internal thoughts.

Writing plays a major role in teaching arithmetic to adults by providing evidence of logical conclusions, justifying different processes and answers, and using facts to explain an adult's thinking (Smith, 2017). Reading and writing of the contexts support mathematical reasoning by building a strong association between language and mathematics learning (Knowles et al., 2012; Dornyei and Ryan, 2015). Reading

multiple texts on similar topics provides the students with broader conceptual coverage and integrated understanding (Bråten et al., 2013). The approaches related to pedagogy are widely applied to get the relevant outcomes, and these pedagogical approaches help young learners to get relevant information (Ozuah, 2016). In terms of using andragogy, reading, writing, and arithmetic teaching will be helpful for the adult learners to improvise their key skills and capabilities effectively (Williams and Williams, 2011). The teachers need to be aware of the learning styles and concepts appropriately. Kolb's model of learning is another perspective applied to retrieve better outcomes (Kolb, 2014). Therefore, the teachers must utilize such designs and models to improve the level of learning within their classroom settings.

The study is highly significant for the teachers to know about the applicable modalities of andragogy for adult learners. For instance, Blikstad-Balas and Sørvik, 2015 claimed that literacy studies help in improving the classroom practices, i.e., it helps gain insights into how students are forged and encouraged to write, read, talk, as well as work with the texts. Moreover, a review of previous studies demonstrates that studies have not assessed this issue from the perspective of adult learners, specifically in Saudi Arabia. Therefore, the study aims to assess the role of reading, writing, and arithmetic teaching among adult learners in Saudi Arabia. The study has contributed to the investigation of the role related to reading, writing, and arithmetic teaching. This would be helpful for the teachers to know about the learning processes and students' psychological attributes to ensure better learning processes.

## Theoretical literature review

The theory applied in this study is termed sociocultural theory (SCT). The rationale for using this theory is that it helps widen the research frame beyond individual perspectives to assist in the construction of different knowledge and to overcome the issues faced at a collective level (Abdulwahed et al., 2012). The literacy/teaching practices are observed to show a substantial role in the success and failure of the students in higher education (Tuck, 2012). Writing and reading are observed as the prime activities, which assist in increasing the students' self-image and the way they learn. Previous studies have shown that students require more than just superficial help for familiarizing themselves with academic literacy to overcome their learning struggles (Fernsten and Reda, 2011; Rai and Lillis, 2013). Similarly, learning in arithmetic requires students to understand and familiarize themselves with the various teaching designs that help them value different writing, reading, and dialog in the classroom concerning their learning (Ulleberg and Solem, 2015).

Precisely, the theory is drawn from the studies conducted by Vygotsky (1962) and Vygotsky and Eccles (1978), where learning is an active process that requires integration of others and cannot be viewed individually. It emphasizes that social context is necessary for development and learning. Vygotsky and Eccles (1978) further defined the human mediator, such as "in the development, the psychological function becomes apparent two times, first when people actually interact and second in the form of inner internalized." This positions learning in the social, cultural, and historical context. It shows that learners' experience, interest, and creativity improve learning. It also integrates critical thinking, where learners engage in the aspects that define a certain aspect socially. Luke and Freebody (1997) stated that learning is gained when codes are broken into written texts; participation occurs for understanding meaning while engaging in visually spoken or written text. Given this, the study uses the write to learn (WTL) model in the teaching activities, which include critical analysis, formative feedback, and assessment. It also integrates information and communication technology (ICT) tools.

Reading can be considered the core of success in school learning and also the main factor in achieving potential after graduation. Teachers at each level of education seek to develop reading abilities among students in every subject area. As explained by Wong et al. (2017), those students who do not possess competitive reading skills are less able to acquire textual knowledge. This study has shown the importance of incorporating graphics into the text to create a more engaging picture in the minds of students (Wong et al., 2017). In contrast, Catts and Kamhi (2017) also showed that the ability of the reader varies from person to person; therefore, a general instruction guide cannot be implemented for a number of readers. Bergey et al. (2017) showed that evaluating the reading history of the individual provides a guideline for the practitioners to develop an effective reading strategy. Similar to this, the study conducted by Chevalier et al. (2017) has also reported the importance of using metacognitive reading strategies to enhance the reading ability of students. A study conducted in Saudi Arabia has investigated the association between reading comprehension performance, reading motivation, and metacognitive reading strategies to prove the claim of weak culture for reading (Meniado, 2016). Hence, reading strategies are found to have a significant impact on the intrinsic motivation of the students, whereas it also influences their vocabulary and reading fluency.

Writing is another important skill that enables learners to communicate effectively. Reading and writing together are highly interrelated and also form a strong relationship with each other. Despite the level of education of a learner, they exhibit writing skills that are lower than expected (Nordin, 2017). Writing combines all the skills required for learning a language into one; therefore, its importance cannot be ignored in the

area of language speaking (Klimova, 2014). In the Saudi context, Sawalmeh (2017) mainly focused on low writing proficiency among the Saudi students. Considering the importance of writing, several training systems have been introduced lately that identify the weaknesses of students and help them to overcome. Despite the training systems, students often feel boredom during the writing sessions, which also influences their academic abilities in terms of writing; therefore, low engagement causes a significant impact on their writing skills (Allen et al., 2016).

Arithmetic learning is often subjected to many factors due to the ambiguity and different levels of understanding among students. To overcome such ambiguity, teachers are often required to incorporate models in their learning process (Jacobson and Izsák, 2015). The teachers often include symbolic representation in their learning process or other graphical representations that enhance the sense-making among students (Jacobson and Izsák, 2015). The traditional skills and methods do not account for the success of creating a positive relationship between algebra and arithmetic (McMullen et al., 2017). To this end, it can be said that to offer great expertise in the classroom, the ability of trainers plays a crucial role in this regard (Aykac, 2016). The difficulty with fractions and decimals in the initial years of students can severely influence their capabilities (Lortie-Forgues et al., 2015). Among such theories, the constructivist theory holds great importance in explaining the classroom teaching practice of the teacher (Clever and Ballantyne, 2014). The process of multiplication and division often causes complexity for the students; to this end, a proper strategy involving explaining the individual structural components is also necessary to enhance the ability of arithmetic learning among students (Agaliotis and Teli, 2016). Similar to this, a study conducted in Saudi Arabia has focused on a new approach to assess students' learning of mathematics through their performance on tasks (Alafaleq and Fan, 2014).

Cao (2017) demonstrated that the theory played an important role in enhancing the significance and effectiveness of college English reading teaching. Zhou (2017) discussed a new phenomenon "task-based instruction" to enhance the application of English reading teaching for non-English courses at Leshan Normal University. The demand for learning English is increasing throughout the world, especially after the new developments taking place in the global world. To this end, task-based instruction was developed; it served as an important and effective tool in enhancing teaching methods.

The study conducted by Wang et al. (2015) showed the effectiveness of problem-based learning (PBL) in the reading teaching strategies. The rationale behind adopting this strategy to enhance the effectiveness of English reading teaching was that still in some parts of the world, questioning has not been adopted as an effective strategy. Another study conducted by

Alyamani (2017) examined the difficulties faced by students in learning mathematics. Learning mathematics increases the anxiety level in the Saudi students; therefore, a number of factors are considered that contribute toward increasing the efficiency level of students in learning mathematics, such as enjoyment level, confidence, teacher efficiency and skill level, external beliefs, and internal beliefs.

The study conducted by Alshammari (2015) has examined the impact of cooperative education and learning system on the learning ability and competency of the Saudi students. The findings revealed that cooperative teaching practices have a positive impact on the competency level of the students. Furthermore, students were able to achieve better academic grades. In another study conducted by Liu (2016), research on vocational English reading teaching was carried out. The teachers are not willing to look for new strategies and methods to improve reading teaching. To this end, the efficiency and accuracy of English reading can be enhanced by using effective methods and strategies and through the promotion of reforms related to trait-oriented education.

A study conducted by Serio (n.d) discussed the impact of engaging students in mathematical communication. The results of the study showed that the implementation of strategies in the mathematic classrooms results in enhancing the abilities of the students to engage effectively in the math talk taking place in the classroom. Another study conducted by Mulwa (2015) discussed the difficulties faced by the students in the learning and the usage of mathematical terminologies. The findings showed that students were not capable of understanding the mathematical terms; also, they have difficulties in the related topics.

Previous studies have failed to explain the role of reading and writing in improving the arithmetic learning of adults. The past literature has explained the importance of reading, writing, and arithmetic learning; however, the importance of individual roles of reading and writing in improving the arithmetic abilities of individuals has not been explored. The importance of reading and writing cannot be ignored when defining the learning abilities of students; therefore, the aim of this study is to review how writing and reading skills can improve the arithmetic learning among adults.

## Methodology

### Research design and setting

The study used a descriptive approach to investigate the role of reading, writing, and arithmetic teaching among adult learners in Saudi Arabia. It is based on a quantitative paradigm of research, which assists in quantifying the study results. The efficiency of the study design has been established in previous studies that use different study scopes and objectives. The study

was conducted at a university located in the Eastern Province of Saudi Arabia.

## Study population and sample

The study population constituted students enrolled in higher secondary classes. A sample of 186 participants was recruited using a non-random sampling method. A purposive approach was employed, where the determined inclusion criteria were used for recruiting the participants. Such students were required to be above 18 years of age, with Saudi nationality. These were also required to be exposed to three or more mathematical approaches concerning reading and writing. All the students recruited were exposed to the same instructors.

## Study procedure

The selected sample was distributed into three groups, as follows:

**Group 1:** Traditional teaching method was used. There were 46 students recruited.

**Group 2:** ICT integrated teaching method was used. There were 49 students recruited.

**Group 3:** WTL and ICT teaching methods were used. There were 91 students recruited.

In Group 1, teachers used lectures for teaching, with the initial focus on reading. In addition, after the completion of one chapter or section, a writing task was initiated. In contrast, in Group 2, the teachers promoted students to continually engage in individual technology use (ITU) without the use of WTL methods. No web arenas or documents were shared in this group, where the focus was on ITU use only. Furthermore, in Group 3, students who have attended a 1-year community-wide course were taught by teachers who integrated ICT for arithmetic. In this course, teachers instruct students on how to read and write and encourage their use of online websites and other web arenas following the formative feedback. The procedure followed includes writing collaboratively, feedback, formative assessment, as well as publishing. Preunderstanding and inspiration are used as supporting components. Generally, students are encouraged to use tablets and computers and different applications such as Google Drive and Google Sites to share documents and websites, respectively. Students were promoted to create and solve mathematical problems using written collaboration, communication continuously, and arithmetic problem solving as well as publishing solutions.

## Data analysis

The data obtained from the three tests conducted were analyzed using Statistical Package for Social Sciences (SPSS) version 20.0. Descriptive and analysis of variance (ANOVA) statistics were used for the computation of the results. The significance value was kept at  $p < 0.05$ .

## Results

Initially, the demographic details of the participants were assessed, as depicted in [Table 1](#). The demographic profile of the participants recruited in the study is presented in [Table 2](#). It has been observed that the majority of teachers were aged between 29 and 35 years and were graduates. The teaching experience was mostly observed between 2 and 5 years ([Table 1](#)).

Three tests were conducted where literacy, arithmetic, and their combined learning were assessed. The literacy score showed that students in the WTL group showed improved results as compared to the ITU and traditional groups. The table below presents the scores of the study, where 90% of the students passed all the tests, whereas 78% of the traditional group students passed, while 77% passed the test in the ITU

TABLE 1 Demographic profile.

Variables		Frequency	Percent
Age	22–28 years	21	11.3
	29–35 years	70	37.6
	36–42 years	55	29.6
	43–49 years	22	11.8
	50 years or above	18	9.7
	Total	186	100.0
Education	Undergraduate	11	5.9
	Graduate	126	67.7
	Post graduate	34	18.3
	Ph.D.	15	8.1
	Total	186	100.0
Experience	Fresh	12	6.5
	1–2 years	28	15.1
	2–5 years	77	41.4
	5–10 years	38	20.4
	Above 10 years	31	16.7
	Total	186	100.0

TABLE 2 Literacy test score.

Groups	Mean	Standard deviation	Percentage (%)
WTL	7.89	0.4354	90
Traditional	7.68	0.7359	78
ITU Group	7.46	0.9755	77

TABLE 3 Arithmetic test score.

Groups	Mean	Standard deviation	Percentage (%)
WTL	7.87	0.4154	81
Traditional	7.63	0.7575	67
ITU Group	7.41	0.9755	56

TABLE 4 Literacy and arithmetic test score.

Groups	Mean	Standard deviation	Percentage (%)
WTL	14.56	1.597	88
Traditional	14.08	1.5413	63
ITU Group	13.65	2.005	58

TABLE 5 Literacy and arithmetic test score.

		Sum of squares	df	Mean square	F	Sig.
WTL	Between groups	72.193	1	72.193	3.389	0.010
	Within groups	22.549	185	0.045		
	Total	94.742	186			
Traditional	Between groups	63.202	1	63.202	5.900	0.420
	Within groups	42.196	185	0.085		
	Total	105.398	186			
ITU	Between groups	13.618	1	13.618	3.720	0.066
	Within groups	95.894	185	0.193		
	Total	109.512	186			

group (Table 2). For the arithmetic test, WTL students scored the highest, such as 81% passed the test, while 67 and 56% passed the test in the traditional and ITU groups (Table 3). The combined literary and arithmetic test scores show that the performance of WTL students (88%) was better as compared to the students in the other two groups (traditional 63% and ITU 58%) (Table 4).

The ANOVA results of the test groups were compared for the three groups concerning the combined WTL, traditional, and ITU groups. The results showed that WTL methods were most significant with a  $p$ -value of 0.010, while it was insignificant for the traditional group ( $p$ -value of 0.420). This shows that the performance of the WTL group exceeds the two (Table 5).

## Discussion

The findings suggest a positive response from the students toward the infusion of writing with ICT and social collaboration in their learning, as evident from the scores. Moreover, the results suggest that the consolidation of the thinking of students can be done by reading and writing in arithmetic. This is consistent with the earlier research of Genlott and

Grönlund (2016), which showed similar results for young students. The results suggest the promotion of training and awareness programs for the teachers by the management of educational institutes. This practice would lead to the adoption of new strategies in the field of education and the rejection of traditional teaching approaches. The results are particularly interesting when WTL group students show better results in contrast to the ITU and traditional groups. The scores of the ITU group are found to be lower, which emerges as an interesting finding, given that the same technologies were used in the absence of formative assessment and collaboration. This lies in-line with the sociocultural theory, which states social interaction as an integral component in learning.

The findings of the study show that refining writing and reading abilities could improve the learning capacity of adults. According to Almazroa and Al-Shamrani (2015), the competency level of teachers influences the learning capability and competency of students. Therefore, efforts should be instigated for integrating WTL strategies for teachers' training and development adopted by educational institutes in Saudi also to create a positive impact on the students. Włodkowski and Ginsberg (2017) reason that this is because the learning quality directly relies on the competence level of the teachers. Gharawi and Khoja (2015) study on students in Saudi Arabia suggested that training and awareness programs must be made compulsory.

The findings suggest that students attained good results in the arithmetic test using the WTL methods. Although this method does not have anything related to numerical values, it shows that the learning of the numbers can be enhanced through communication. These results imply that learning in arithmetic is related to the understanding of the problems and their ways adopted to solve them. The method promotes teachers as well as students to engage and discuss arithmetic issues, work collaboratively, and provide reasoning through formative assessment.

The WTL method often forces the teachers to be efficient in assisting reading learners. The strategies to promote the learning system in schools by the management would be found effective in offering proper support mechanisms within classroom teaching (Moore, 2015). It has been suggested that students take advantage of working jointly with language and speech therapists and teachers in the classroom (Wilson et al., 2015). Moreover, teachers must take initiative to create an environment favorable to reading (Richards and Rodgers, 2014), which has been found as an effective and significant lack that affects the Saudi Arabian learners in reading comprehension (Al Nooh, 2013).

The results also show that the adoption of new strategies in the field of education and the rejection of the traditional teaching approaches are important. Consistent with these findings, Alabdulaziz and Saleh (2017) also termed these

strategies effective for enhancing the skill level of the student's learning mathematics. The management of the school provided relevant training to the teachers in using the latest technology along with collaborative learning. Another study conducted by [Albugami and Vian \(2015\)](#) examined the impact of ICT around educational institutes in Saudi Arabia. The implementation of ICT in educational institutes and the performance level of the students are interlinked with each other. The implementation of ICT proves to be a major challenge for educational institutes in Saudi Arabia due to the non-availability of resources and space. The ICT contributes toward enhancing the efficiency of the educational system. [Alrashidi and Phan \(2015\)](#) also suggested that the Saudi teachers use many ways for teaching, but some teachers are unaware of the use of media, which may account for the difficulties they face in teaching.

## Practical implications

Policymakers can use the results of the study in formulating long-term strategies for improving the standard of education in Saudi Arabia. The development of reading in the classroom environment would also rely on the supporting tools and ways for English reading. Schools must also develop reading and learning laboratories and engage these in the reading curriculum, especially in English and mathematics. It has been observed that students are interested to learn and participate in the activities when they work collaboratively ([Al Nooh, 2013](#); [Brophy, 2013](#)). It is important to consider that the practices involved to assist students in the classroom by the teachers can be effectively acquired by implementing effectual strategies. The students must be allowed to read the books of their own choice, and it must be the duty of teachers to assist them when they find it difficult to learn the basics. Therefore, the strategies adopted by the teachers must be effective and should be based on the feedback provided. The findings suggest that the learning culture and environment of Saudi Arabia should be encouraged to promote the local Saudi students to acquire expert-level expertise in English and arithmetic. Management in schools can use the test formulated to check whether the students from different age groups have similar results or not.

## Limitations

This study provides significant findings; however, the study is subjected to a number of limitations. First, the use of a mixed methodology could have assisted in highlighting the main drawbacks and could provide more insightful and comprehensive information. Second, the sample size of the study was small, which also influences the reliability and

generalizability of the results. Third, the study was only conducted in Saudi Arabia; therefore, the importance of this topic cannot be evaluated certainly for the schools of Middle Eastern countries.

## Conclusion

Learning mathematics and acquiring reading and writing skills are a major challenge for the Saudi students. The study suggests that WTL methods are effective among Saudi learners for their effective learning. It has been concluded that reading, writing, and collaborative working in arithmetic may also facilitate the students to consolidate their thinking. The implementation of reading and writing strategies using ICT in teaching arithmetic could play the main role for adult learners. The study suggests that the traditional approach utilized by the teachers must be eradicated and modified into a modern form as results from the WLT method are better in comparison with the traditional method. The study provides a few recommendations for decision makers, which can help enhance the efficiency and productivity of instructor development programs. This study is based on a smaller sample size; whereas, future studies may execute the aim by recruiting a larger sample size and more teachers as participants to examine the requirements more precisely. Furthermore, future studies can use a longitudinal research approach to analyze the research objective. In addition, adopting a qualitative data collection technique would give much comprehension to readers in understanding the views and opinions of teachers. The teachers acquiring relevant teaching training would be able to enhance the competency level of the Saudi students in learning mathematics, English, and various other courses. A competent and skilled instructor influences the performance level of the students. Therefore, policymakers must invest in teacher training and development programs.

## Data availability statement

The original contributions presented in this study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## Author contributions

SA assisted in data analysis and description as well as provided source of funding for the publication. RA assisted in some writing and editing of the final version of the

manuscript. All authors contributed to the article and approved the submitted version.

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