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Original Article

Mathematics Interest among O-Level Secondary School Students in Wakiso District, Uganda

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Interest, Individual Interest, Situational Interest, O-Level Secondary School Students.

ABSTRACT

The study investigated interest levels and differences in mathematics among O-level students in Wakiso District. Since interest is a psychological state, people can be unaware of it, making it simple for educators to presume that it is or is not present. In the current study, mathematics interest levels among Senior Three pupils in the Wakiso district were evaluated, and narratives from the students and teachers revealed the causes of the low interest. Three hundred and thirty-two students were used for the quantitative data; six students from each school took part in focus group discussions, and one O-level mathematics teacher from each school took part as key informants for the qualitative data. Quantitative results revealed that; students had high interest in mathematics (84%), had more situational (M = 37.00, SD = 8.10) than individual interest (M = 30.67, SD = 5.82). There were significant gender differences in overall interest Males (M = 73.61, SD = 13.22) than females (M = 69.93, SD = 13.60) individual interest Males (M = 31.32, SD = 5.76) than females (M = 30.03, SD = 5.83), and situational interest males (M = 38.19, SD = 7.81) than females (M = 35.83, SD = 8.21), $p < .05$. in mathematics, but not in other demographics. Qualitative findings, however, revealed low interest in mathematics, pointing out various reasons for their low interest (mathematics being tough, complex, boring, full of calculations, unrelated to ral life, intended for the intelligent, previous poor performance). According to the study's findings, the challenge of low interest should not be left to students only, but all stakeholders in education should take part in developing and maintaining students' interest in mathematics. There are still gender differences in mathematics interests, which impacts females' interest in the subject.

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INTRODUCTION

Interest is a concept that researchers have recently picked interest in to understand the process and outcomes of learning (Atasoy, 2015). Promoting interest in education is a priority for educational institutions, particularly in mathematics, where secondary school students have a low level of interest (Xu et al., 2021). For the study of any science discipline, mathematics is a required core subject in secondary education (Duru & Okeke, 2021). The competence acquired through studying mathematics is well known and applied in many areas of life, including influencing how people interact with different aspects of their private, social, and civic lives, contributing to the socioeconomic development of a country, and serving as a link to all knowledge sources (Salifu & Bakari, 2022; Chand et al., 2021). This justifies why all students who complete basic and secondary education in most countries must study mathematics (Arhin & Yanney, 2020; Fosu et al., 2023).

Studies about interest show the values of interest in mathematics and schooling, for example, having a significant relationship with learning outcomes (Zainar et al., 2021) and predicting students' grades in mathematics (Laine, 2019). Despite the values of interest, different studies still report low interest levels among students. For example, despite mathematics being compulsory at the O level in Uganda, there are low numbers of students who continue with mathematics at the A level. For example, out of the 330,080 candidates that sat for UCE Mathematics in 2019, only 11.7% continued and sat for UACE Mathematics at A level (UNEB, 2023). To retrain teachers and improve the use of professional skills for high-quality teaching, Uganda launched the Secondary Science and Mathematics Teachers' (SESEMAT) in 2005 through the Ministry of Education and Sports (MoES) and Japan International Cooperation Agency (JICA) (Mbeya, 2020).

Notwithstanding all the attempts, the crucial question is whether students' interest in the subject may be linked to the mystery surrounding mathematics. This is because the majority of research in Uganda has focused primarily on students' academic performance and accomplishment, and the issue is still reportedly present, particularly according to UNEB. The study aimed to evaluate the levels and variations in mathematics interest among O-level students in the Wakiso District.

The study's findings are expected to contribute to the international body of knowledge on Ugandan students' interest in mathematics and serve as a source of information for empirical researchers. The study's findings may be helpful to educators and decision-makers in creating strategies to boost students' interest in mathematics, which might then be used as a springboard to raise students' interest in other science subjects.

LITERATURE REVIEW

Theoretical Review

Hidi and Renninger's (2006) Four-Phase Model of Interest guided the research. The model describes four stages of learner interest development and deepening: A triggered situational interest is the first stage of interest development. If this first phase is sustained, it will progress into the second phase, which is maintained situational interest. The third phase, which is characterised by a less

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developed individual interest, may emerge from the second phase. The third stage of interest development might subsequently lead to the fourth stage, which is a well-developed individual interest (Hidi & renninger, 2006; Harackiewicz et al., 2016; Renninger & Hidi, 2020). The four phases are regarded as sequential and discrete, signifying a type of cumulative and progressive advancement in situations where interest is nurtured and maintained, either from external assistance or due to perceived challenges or opportunities associated with a task. Nevertheless, in the absence of external assistance, each stage of interest growth has the potential to become inactive, revert back to a prior stage, or cease to exist entirely (Hidi & Renninger, 2006; Renninger & Hidi, 2020).

The model has been employed in studies examining interest levels and strategies for fostering interest (Darlington, 2017; Hogheim, 2017; Kwarikunda et al., 2020). When employing the model to explain the concept of interest, it is observed that interest arises from the interplay between an individual and a certain subject matter. The potential for interest resides inside the individual, while the content and the surrounding environment shape the trajectory of interest and facilitate its growth. As a result, other people, the organisation of the environment, and a person's own efforts can all help to foster interest development (Hidi & Renninger, 2006).

In the context of this study, the researchers hypothesised that there exist varying degrees of interest in mathematics, and that these differences can be attributed to various individual and environmental factors. This research didn't make distinction between Triggered Situational Interest and Maintained Situational Interest, as well as between Emerging Individual Interest and Well-developed Individual Interest. It majorly focused only on two overarching phases, namely Situational Interest and Individual Interest.

Empirical Review

Levels and Differences in Mathematics Interest

Interest in psychology is well reviewed by Schiefele (1991) and can be traced back to Herbart in 1806. It is linked to Dewey in 1913 in modern interest research. With the advent of behaviourism, interest lost its importance in education and psychology, according to the review. Fortunately, it was revitalised by Schiefele in 1974 after the realisation that the concept of achievement motivation was solely oriented on outcomes and performance, ignoring that students enjoy learning because they appreciate engaging in certain disciplines. Researchers Renninger, Hidi, and Krapp from the 1980s are credited with the most recent study on interest (Schiefele, 1991). Interest research can help answer concerns about why people participate in or withdraw from various topics, themes, or circumstances (Laine, 2019). Interest is the tendency to continually engage with a certain object, event, or idea over time (Laine, 2019; Renninger & Hidi, 2011). According to Renninger and Hidi (2011), there are two types of interest: situational and individual. Individual interest is consistent, stable and includes delight, personal significance, a preference for a subject, and an all-around preference for a certain field (Atasoy, 2015; Renninger & Hidi, 2011). Conversely, situational interest refers to a state of alertness and affective reaction at a specific moment in the environment that may be prompted by an environmental stimulus that may or may not be persistent (Laine, 2019; Renninger & Hidi, 2011).

For school students, mathematics is typically a difficult subject where they find trouble trying to build their conceptual mathematical understanding (Asmira et al., 2021). Their interest may be substantially affected by this. Most evidence in the literature shows that students are less interested in mathematics. For instance, Arhin and Yanney (2020) and Ukobizaba et al. (2021) discovered that students showed little interest in mathematics. On the other hand, Salifu & Bakari's (2022) research revealed that students in Ghana had a good attitude towards mathematics. The

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contradiction in findings necessitated an investigation about mathematics levels in O level students. The lack of student interest in mathematics is attributed to various factors. Iwuanyanwu (2021) adds that both therapeutic and preventive strategies and techniques are required for teachers and other social figures to enhance secondary school students' interest.

Various misconceptions about mathematics that contribute to low secondary school interest must be dispelled under the curative approach. According to research, some of these reasons include the fact that mathematics is inherently a very challenging subject (Jameel et al. 2016), that it is boring and abstract, difficult for students to understand, has nothing to add to student's lives and that it is only appropriate for gifted and high achievers (Salifu & Bakari, 2022). Other aspects identified by research findings include inadequate practice (Kihwele & Mkomwa, 2022) and previous experiences with mathematics, such as failing or passing the subject (Ukobizaba et al., 2021). Low grades Ukobizaba et al. (2021), anxiety (Atoyebi & Atoyebi, 2022), and confidence in one's abilities (Gjoka, 2022).

Gender stereotyping is responsible for additional misconceptions. According to Akinrotimi and Imoh (2022), the majority of people believe that men are stronger and more capable than women in particular subjects, notably science-related subjects like mathematics. As a result, females tend to show less interest in mathematics than males do, for instance. Oluyemo et al. (2020) discovered that compared to their male counterparts, females show less interest in mathematics. Studies on gender differences in mathematics support the literature; for instance, Oluyemo et al. (2020) in Nigeria and Tembe et al. (2020) in the Sub-Saharan region both discovered that females exhibited much lower interest than boys. However, Song et al. (2019) discovered that there were no differences between girls' and boys' mean interests, and Musbahu et al. (2020), in a study about Junior secondary schools in Nigeria, discovered that female students showed greater interest in mathematics than their male counterparts.

Social others, such as parents, peers, and teachers, have also been noted as being to blame for students' low interest in mathematics. For instance, Jameel and Ali (2016) discovered that most mathematics teachers do not make mathematics teaching practical and engaging. Studies by Mun and Hertzog (2018) and Kihwele and Mkomwa (2022) have shown that teachers' teaching methods and strategies can increase or decrease students' interest. Literature highlights the continued existence of disparities in interest in different contexts and different reasons cited. No study in Uganda has looked at the diverse levels of interest, revealing both situational and individual interest in mathematics among O-level students, and most studies in Uganda have mostly focused on academic achievement in mathematics. Various reasons were cited for low interest in mathematics and whether the results applied to Uganda lower secondary school students was worth the current study through a mixed-methods approach. The discrepancies in literature too, therefore, called for additional investigation into students' interests.

Based on previous literature findings, it is predicted that student interest in mathematics would be low and that there would be big disparities between individual and situational interest. Furthermore, it is anticipated that there are a variety of misconceptions and factors concerning mathematics that contribute to the low levels and variances in mathematics interest among O-level pupils in the Wakiso district based on gender, school type, and school location. The study findings are expected to contribute to literature explaining levels of interest in lower secondary school students. The findings may also help policy makers devise curative and preventive measures to improve students' interest in mathematics which may improve the overall performance in mathematics and science subjects in general.

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METHODOLOGY

The study used a mixed-methods approach combining quantitative and qualitative approaches, following a pragmatic paradigm. A convergent parallel mixed methods design was employed with a QUAN + qual technique. Focus groups, key informants' guides and closed-ended questionnaires were used for collecting data.

Study Participants

A quantitative sample of 335 students from 16 schools in 8 sub-counties obtained from a population of 2673 students in Wakiso District was used in the study. Thre are two counties in Wakiso District. The subcounties were proportionately selected. The county with the highest number of subcounties contributed to five counties and the other one three. Each sub-county contributed to two schools that were randomly selected, one public and one private. In the study, only mixed schools were taken into account. Proportionate random sampling was also employed to select the schools for the study. The higher the population, the higher the representation. The final sample was chosen using systematic random sampling. To collect qualitative data, one O-level mathematics teacher served as the key informant guide from each school, and six students from each school participated in Focus group discussions. Wakiso district was chosen because despite its good geographical location in the Central region of Uganda and good performance in the national examinations, there are still challenges reported about mathematics (Uwezo, 2017). Researchers wondered whether the challenges reported can be explained by interest research.

Data Collection Instruments

The quantitative questionnaire had two sections, including students' demographic characteristics of gender and school type and interest. Interest was measured using an adapted questionnaire by Darlington (2017). The questionnaire was slightly modified to fit the context of the respondents. Individual interest was measured with 8 items. 8, 9, 10, 13, 14, 15, 17 and 18. Items 13 and 18 were negatively stated. Situational interest was measured with 10 items- 1, 2, 3, 4, 5, 6, 7, 11, 12, 16. Items 3, 12 and 16 were negatively stated. Negatively stated items were reverse-coded during data analysis. A 5-point Likert scale was used- (1) Strongly Disagree, (2) Disagree, (3) Not sure, (4) Agree, (5) Strongly Agree.

Qualitative data from students was collected using a Focus group interview guide with 5 questions, and data from teachers was obtained using interviews with a key informant's interview guide containing 5 questions. To ensure validity and reliability, all the tools were pretested, and the Cronbach Alpha Coefficient (α) for interest was 0.93. Factor analysis was also done since the adopted tool was self-constructed by the researcher and had not been tested in many contexts. The initial questionnaire had 28 items, and 10 items that were loading below .03 were removed.

Research Procedure

Before collecting data, permissions from DEO Wakiso and the school administration were obtained. Pre-visits to schools were conducted, and two trained research assistants participated in data collection. The head teachers and directors of studies were reached first, who led the researchers to the class teachers. The class teachers provided class lists to aid in sampling, and students were asked to participate willingly in the study. Data was collected during convenient times of the school to avoid disrupting lessons. Focus group discussions (FGDs) were done in comfortable places provided by the school. Mathematics teachers who had been contacted prior to the day of collecting data to make appointments with them were interviewed as key informants. The interviews lasted for an average of 25 minutes. FGDs and interviews were audio recorded with consent from the participants and the school heads.

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Data Analysis

Quantitative Data

Data were analysed using SPSS version 23, and Descriptive statistics was used to test the levels of interest using aggregated mean and standard deviation, paired sample test for testing differences in individual and situational interest, t-test for differences in mathematics interest by gender and Kruskal-Wallis test for differences in interest across other demographics.

Qualitative Data

Manual analysis was used to analyse the qualitative data from focus group discussions and key informant interviews. To further clarify the pertinent quantitative findings, the qualitative findings are provided per the themes, subthemes, and categories using direct quotations from the data set.

Ethical Considerations

Permission for collecting data was sought from Kyambogo University, Wakiso district and from the schools. Ethical clearances were obtained from the Mbarara University of Science and Technology Research Ethics Committee (MUST-REC) and the Uganda National Council for Science and Technology. Confidentiality was ensured, informed consent from teachers was ensured, student assent was obtained, no recordings were made without the participants' permission, and their opinions were respected.

RESULTS

General Information

Out of the 335 questionnaires distributed, 3 questionnaires that were not well filled were left out, indicating a 99.1% response rate. Data was collected from 332 students. 164 (49.4%) males and 168(50.6%) females. Government-aided schools contributed to 152 (45.8%) students and 180(54.2%) private schools. Urban schools contributed to 253(76.2%) and rural schools 79(23.8%). Overall interest in mathematics was measured as a sum of individual and situational interest items. Also, comparisons against individual and situational interests were made. Mean values and frequency counts were used to establish the levels of mathematics interest. A mean of 18-53.99 indicated low interest in mathematics, a mean of 54.01 to 90 indicated high interest in mathematics and a mean of 54 indicated that one was unsure (Darlington. 2017). The results are described in *Table 1*.

Table 1: Levels of Mathematics interest among students

Level	N (%)	Mean
Low interest	46 (13.9)	67.67
High interest	279 (84)	
Not sure	7(2.1)	
Total	332	

Results in *Table 1* show that most students had a high interest in mathematics. However, most qualitative narratives indicated that students had a low interest in mathematics. For example, twelve teachers rated their students as having low interest in mathematics. Further, the majority of the students in qualitative interviews rated students in their schools as having low interest in mathematics. Below are the qualitative narratives that rate students' interest and the reasons for the low interest.

Some students had this to say;

Not all students in our class are interested in mathematics; few are interested in it because they say it is a hard subject (Female student 5, FDG 7)

Most students are not interested in mathematics because they say mathematics is not a joking subject; it is full of calculations and difficult (Male student 2, FDG 2)

… because some see math to be interesting while some see mathematics to be boring (Male student 1, FDG 6).

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> *I am not interested in mathematics because it is tiresome and difficult. If it was not compulsory at O-level, I would not take it. I would advise the government to leave mathematics to those who are capable and interested in it* (Male student 3, FDG 2)

The narratives above show that some students have low interest in mathematics because mathematics is hard, difficult, full of calculations, boring and for capable students.

Another student had this to say;

> *Some students are not interested in mathematics because they think that most of what we are studying in mathematics cannot be used anywhere, but the fact is mathematics is everywhere, from counting money, time, running businesses and others* (Female student 1, FDG 8).

Another student said,

> *Some are interested in Mathematics because some are interested in their teachers, while some are not. I mean the way teachers teach, dress, and handle us* (Male student 6, FDG 9)

The narrative shows that some students are less interested in mathematics because they think it cannot be applied anywhere in real life and attribute their low levels to their teacher's way of teaching them.

Teachers also said the following about students having low interest

> *Some are interested some are not. You know students have the mentality that math is hard and complicated, so it makes them less interested in it* (Male teacher 1)

> *Learners are not so interested because there is a slogan that math is hard, and we all know that if you do not give math time, then it becomes hard* (Male teacher 5)

> *My students are average learners and are not interested. For example, you write a number on the chalkboard, and you hear a student saying, that is why I hate math and its calculations* (Female teacher, 7)

> *Some students say that mathematics is for the highly intelligent students. But also, some of my students say that they have never passed mathematics as they pass other subjects like arts subjects. So, the low marks demotivate them and lose interest in the subject* (Female teacher 8)

The narratives indicate that students have low interest in mathematics because it is boring, hard, difficult, complicated, full of calculations, and cannot be easily applied to real life for the highly intelligent and because of their previous poor performance. They also attribute it to their teacher's way of teaching them.

Table 2: Differences in individual and situational interest

	N	Mean	Std. Deviation
Situational interest	332	37.00	8.10
Individual interest	332	30.67	5.82

Table 2 results show differences in individual and situational interest among students. The mean was higher for situational interest (M = 37.00, SD = 8.10) than for individual interest (M = 30.67, SD = 5.82). $p < 0.01$. The results suggest that students had more situational interest than individual interest.

Table 3: t-test for differences in interest across gender

Comparison variables		N	Mean (M)	SD	F	T	P
Overall Interest	Male	164	73.61	13.22	0.06	2.50	0.01
	Female	168	69.93	13.60			
Individual interest	Male	164	31.32	5.76	0.04	2.04	0.04
	Female	168	30.03	5.83			
Situational interest	Male	164	38.19	7.81	0.43	2.68	0.01
	Female	168	35.83	8.21			

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The results in *Table 3* indicate statistically significant differences in interest across gender. Males had more overall, individual, and situational interest than females. Males (M = 73.61, SD = 13.22) than females (M = 69.93, SD = 13.60) for overall Interest, Males (M = 31.32, SD = 5.76), females (M = 30.03, SD = 5.83) for individual interest. And males (M = 38.19, SD = 7.81), females (M = 35.83, SD = 8.21), $p < .05$. For situational interest, This implies that gender is a significant factor in students' interest in mathematics. Qualitative results also indicated that students' interest in mathematics was dependent on gender.

One student said,

> *For me, I want to be a doctor, but my friends always put me down, saying I cannot be one because I am a girl. They say mathematics and sciences are not girl things. For them they are more interested in arts subjects, and there are few A-level girls taking sciences in our school* (Female student 5, FDG 9)

Teachers also had this to say;

> *To me, gender influences students' interests. Some girls think that math is for boys and relax, leaving it for boys. They are in lessons but not minding* (Male teacher, 3)

> *Also, gender bias: some girls have a mentality that girls cannot do math, like here, girls wonder how (me a female teacher) I can be good in math* (Female teacher, 4)

The narratives indicated that some students' interest, especially females, was dependent on their gender.

Table 4: Kruskal-Wallis test for overall interest across different demographics.

		N	Mean Rank	p
Age	13-14	8	207.44	0.16
	15-17	296	163.09	
	18-20	28	190.88	
	Total	332		
School Type	Day only	11		0.83
	Boarding only	120	170.71	
	Mixed day and boarding	201	163.91	
	Total	332		
School Categorisation	Urban-Government	116	171.60	0.66
	Rural-Government	36	152.90	
	Urban-Private	138	168.88	
	Rural-private	42	156.24	
	Total	332		

Results in *Table 4* and Appendix 1 show no statistically significant difference in overall interest among the students by age, school foundation and location, or parents'/guardians' occupation. This implies that students' age, parents'/guardians' occupation, school type like day, boarding and day and boarding or school foundation and location like being in a government school or private, rural, or urban do not provide any benefits or cause a deficiency in students' mathematics interest.

Qualitative results, however, yielded different themes on students' interest in mathematics apart from gender.

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Table 5: Kruskal-Wallis test for differences in individual and situational interest across different demographics

Demographic		Variable					
		Individual interest			Situational interest		
		N	Mean rank	P	N	Mean Rank	P
Age	13-14	8	204.19	0.24	8	198.38	0.36
	15-17	296	163.50		296	163.98	
	18-20	28	187.46		28	184.00	
	Total	332			332		
School Foundation and location	Urban-Government	116	174.21	0.54	116	167.62	0.73
	Rural-Government	36	150.21		36	154.82	
	Urban-Private	138	167.05		138	171.38	
	Rural-private	42	157.38		42	157.37	
	Total	332			332		
School type	Day only	11	161.00	0.92	11	174.59	0.81
	Boarding only	120	169.15		120	170.30	
	Mixed day and boarding	201	165.22		201	163.79	
	Total	332			332		

Results in *Table 5* and *Appendix 1* show no statistically significant difference in individual interest and situational interest among the students by age, school foundation and location, or parents'/guardians' occupation. This implies that students' age, parents'/guardians' occupation, school type like day, boarding and day and boarding or school foundation and location like being in a government school or private, rural, or urban do not provide any benefits or cause a deficiency in individual and situational interest. However, the qualitative narrative indicated some students are either interested or not interested in mathematics because of their parents'/guardians' occupation.

> *Some students are interested in mathematics because of the inspiration of their parents and other guardians, like the father being an engineer* (Male student 4, FDG 12).

> *I am a bit interested in mathematics because I want to be a surgeon like my mum. She encourages me a lot. Although I find mathematics hard and, I am not performing so well in it* (Female student 2, 12).

Another student said,

> *Some of them are interested, and others not because of the family background; for example, in the family, if you do not have any doctor when you are all lawyers, someone also aims at becoming a lawyer instead of a doctor* (Male student 3, FDG 9).

The students' narratives show that some students' interest depends on their parents' occupations or careers.

One teacher had this to say

> *...Another thing is the family background; for example, some parents talk ill about mathematics because some students say that their parents tell them they can't do mathematics because it is hard and advise them to take easier arts subjects they can pass like them and students take those conceptualisations seriously because they are from their models and immediate family members who even pay their fees. That impacts on their math interest* (Male teacher 3)

> *...To some of them, it is because of the little funds their parents have. I mean being able to pay school fees or not. If a parent is poor, then you do subjects you can easily pass other than taking mathematics, that is hard; fail it and waste your parents' money. Some of us are doing mathematics because it is compulsory at O-level* (Male teacher 1)

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The narratives indicate that some students' interest depends on the parents'/guardians' occupation.

DISCUSSIONS

According to descriptive results in *Table 1*, most students showed high interest in mathematics. However, the qualitative results differ from the quantitative ones. This is because students and teachers in most schools assessed their interest in mathematics as low. Qualitative findings show that students' interest levels were low for various reasons. The qualitative results are consistent with UNEB reports, which indicate that, despite mathematics being compulsory at the O-level, few students continue with it at the A-level, pointing out interest as one of the reasons for the low numbers (UNEB, 2023). The qualitative findings support earlier findings by Arhin & Yanney (2020) and Ukobizaba et al. (2021) that students showed little interest in mathematics. Quantitative results aligned with Salifu & Bakari (2022), who discovered that students had a favourable interest in mathematics. Students' low interest was also shown by qualitative findings from the students and teachers, who attributed it to the subject's nature. Mathematics being tough, complex, boring, full of calculations, unrelated to real life, and intended for intelligent people and past failures in mathematics in the past and present were cited by students as contributing to low levels of interest. The results are consistent with other studies' findings (Salifu & Bakari, 2022; Ukobizaba et al., 2021), identifying comparable mathematic misconceptions as a factor in low mathematics levels.

Comparing situational interest with individual interest indicated that students had more situational interest than individual interest. This finding explain why more students who are interested in mathematics at the O-level ultimately decide against continuing with it to other educational levels since they have not transformed that interest from situational to individual interest. The findings were consistent with some of the students' accounts, which indicated that teachers and peers were important environmental influences on most students' interest in mathematics, and few were prepared to pursue it beyond the O level. Mun and Hertzog (2018) Kihwele and Mkomwa (2022) emphasised the importance of teachers in fostering students' interest.

Results in *Table 3* showed a statistically significant difference in overall interest, situational interest, and individual interest in mathematics by gender, with males more interested in mathematics than females. The result is in line with teachers' narratives that showed that low-interest levels are attributed to gender, where most girls think that mathematics is meant for boys. The results are in agreement with Marriott et al. (2019) in the USA, Tembe et al. (2020) in the sub-Saharan region and Oluyemo et al. (2020) in Nigeria, who showed that males showed a higher interest in mathematics than females. Mathematics is believed to be complex, abstract, and hard, and males are believed to be more capable and stronger, so they are capable of hard, abstract mathematics than their female counterparts, who are believed to be frail and weak. This conceptualisation of mathematics affects females' interest in the subject.

Tables 4 & 5 and *Appendix 1* compared overall interest, individual interest and situational interest with different demographics and results showed no significant differences in interest across different demographics. The results indicate that students' different demographics, like the school location whether urban or rural, government-aided or private, and parents' occupation or age, do not contribute to students' having high or low interest in mathematics. However, qualitative results differ from the quantitative results. The narratives indicated that factors like parents' occupation impacted students' interest in mathematics. A well-paying job means having more money to pay for a child to take any math-related course they want. When compared to arts courses, STEM courses are more expensive, so students' interest was dependent on the parental assurance to pay for the course they wanted.

On the other hand, a low-paying job implied that continuing with mathematics despite poor math

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performance would waste one's parents' limited resources. Students believed they should only choose subjects they were confident in passing, such as arts subjects. Students were also interested or not in mathematics because of the inspiration they got from their parents. Literature also presents contradicting results; for example, Musbahu et al. (2021) found out that students in private schools excel more in mathematics than students in public schools, but students in public schools have more interest in mathematics than their counterparts in private schools. The qualitative results indicated that students have a low interest in mathematics, and different reasons were pointed out. The results agree with the four phase interest model about personal and environmental factors explaining interest in learning. It is therefore the work of all stakeholders to improve students' interest. The task should not be left to only students.

CONCLUSIONS

The quantitative results indicated that students had high interest in mathematics, contradicting qualitative results that showed that students had low interest in mathematics. Different reasons were cited during focus group discussions and interviews with teachers, including socialisers, and the nature of mathematics, as reasons for the low or high interest in mathematics. This meant that improving students' interest in mathematics was not only for the students but a collective effort from all the stakeholders. Interest in mathematics is associated with many benefits, including students' learning and overall success in mathematics. Gender differences in mathematics still exist, which may be originating from gender stereotypes. It implies that girls have not overcome the stereotyping messages around mathematics, which also needs to be worked on by everyone in society.

Recommendations.

Since qualitative narratives revealed that students had low interest in mathematics, the researchers recommend all stakeholders use the curative approach to clear misconceptions around mathematics and the preventive approach by teachers looking for approaches in schools to develop and sustain interest.

The study was limited to one Ugandan district, Wakiso, so there is a need to carry out studies in interest across Uganda, including parents as key informants.

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APPENDIX

Appendix 1: Kruskal-Wallis test for overall interest, individual interest and situational interest

Variable	Categories	Frequency	Overall interest		Individual interest mean rank		Situational interest mean rank	
			Mean rank	p	Mean rank	p	Mean rank	p
Parents'/guardian's occupation	Police Officer	11	162.27	0.23	150.64	0.50	166.14	0.09
	Business man/Woman	84	164.08		161.47		166.43	
	Soldier	7	160.64		183.00		148.50	
	Bursar	11	112.32		134.32		99.82	
	Farmer	23	156.41		156.85		156.15	
	Graphic designer	11	180.55		184.45		166.64	
	Teacher	25	185.08		187.08		179.78	
	Doctor	11	169.68		184.32		154.91	
	Accountant	9	147.22		145.39		150.78	
	Cook	11	181.27		181.36		186.36	
	Hair dresser	6	190.67		180.67		186.33	
	Shopkeeper	21	152.33		173.57		135.48	
	Soccer player	2	157.00		157.75		169.75	
	Secretary	6	171.17		178.08		169.33	
	Electrician	7	109.21		104.36		126.07	
	Driver	9	178.11		168.39		193.78	
	Engineer	9	214.50		212.39		215.22	
	Plumber	6	164.67		141.33		179.00	
	Mechanic	8	197.75		157.13		222.06	
	Surveyor	5	137.90		152.00		130.40	
	Nurse	7	215.29		192.64		231.64	
	Carpenter	4	147.00		129.38		175.25	
	Fashion designer	5	78.00		77.40		81.80	
	Jounalist	5	123.50		118.80		140.50	
	Builder	4	120.13		153.38		109.00	
	Baker	4	120.00		132.75		110.00	
	Banker	5	239.40		230.30		244.00	
	Pastor	6	221.92		217.75		220.00	
	Revrand	2	68.50		77.50		69.50	
	Technician	8	248.06		239.31		241.19	
	Total	332			100.0			

