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Challenges and Opportunities of Artificial Intelligence Integration in Higher Education in Somalia

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Abstract

The integration of artificial intelligence (AI) promises to bring about numerous opportunities and challenges in higher education while enhancing teaching, learning, and quality improvement in this sector. This study focused on the opportunities and challenges of the integration of AI in higher education as well as its contribution to quality improvement. A quantitative survey research design was selected for this study. The target population comprised students, ICT staff, lecturers, and administrators in higher education institutions in Somalia. A sample of two hundred and twenty-four (224) respondents was selected from the target population. The study used frequencies, percentages, means, and standard deviation in reporting the results of the study. The results of this study revealed that challenges of the integration of AI in higher education were perceived to be high (M = 3.289). The major challenges included low perception of students regarding the applications of AI in higher education, the need for enhanced ICT infrastructure, the cost of AI technology, the absence of AI-related institutional policies, and the low level of knowledge and skills on part of academic staff handling AI technology. However, participants perceived the opportunities presented by AI technology in higher education to be high (M = 3.547). The opportunities included; boosting the chances of students accessing learning materials, promoting readiness and skills for future jobs, promoting innovative strategies for teaching and learning, enhancing effective teaching and learning, and improving administrative processes. In addition, the study found that the contribution of AI to quality improvement in higher education was high (M = 3.488). Personalized learning was the most perceived contribution of AI to quality improvement in higher education (M = 3.929), followed by improved teaching and learning (M = 3.732), and more effective teaching and learning by lecturers (M = 3.571). The study recommends that for AI systems to promote quality in higher education, there is a need to invest more in ICT infrastructure, invest more in AI, raise awareness among students about AI, develop institutional policies on AI, and implement quality assurance measures.

1. Background to study

Artificial intelligence has had a major impact on many spheres of human activity. In particular, it has had a tremendous effect on education. The use of artificial intelligence in education has led to major improvements in such areas as admissions, pedagogy, learning, cheating, and ethics. However, despite the obvious effect that AI has on these areas, the detail of this effect is often unclear. The purpose of this research is to analyze the effects of AI on education in detail in an attempt to understand its impact [1]

Worldwide, universities embrace artificial intelligence (AI) to offer personalized learning, manage administrative functions, give advice, develop curriculums, grade assignments, detect plagiarism, perform data analysis, provide virtual assistance, and conduct research activities. Artificial intelligence has enabled the establishment of learning management systems, tutoring systems, plagiarism checkers, and grading systems that have improved the learning process and made it more convenient for students and teachers. Additionally, AI has also facilitated the creation of predictive analytics, virtual assistants, and generative-based applications that support students and make education more accessible Challenges associated with the adoption of artificial intelligence include privacy orphans, cyber threats, ethical issues, cheating risks, access inequality, low-quality AI, poor policies, financial constraints, and lack of AI expertise. Moreover, colleges and universities also face organizational obstacles such as resistance to change, cultural barriers, poor governance structures, and unclear strategies in adopting AI technologies. The adoption of AI in higher education presents a wide range of opportunities but comes with a set of unique risks [2],

Like the rest of the world, African universities are considering AI to make education more accessible and cost-effective while at the same time improving the learning process. African countries such as South Africa, Kenya, Rwanda, Nigeria, Egypt, and Ghana are investing in various AI-based innovations to transform education, research, and digital economies. However, the adoption of AI in education faces numerous challenges brought about by infrastructural shortcomings, limited funding, unreliable internet and electricity, insufficient human resources, and poor national policies. Consequently, most African universities find it challenging to implement AI-based innovations [3]

2. Literature Review

2.1 Challenges of Artificial Intelligence Integration in Higher Education

Artificial Intelligence (AI) has become an important technology in the higher education sector. It is changing the way universities teach, assess, conduct research and manage their activities. The rise of AI-based technologies has given education institutions new chances to improve the quality, efficiency and access to education. AI can help with learning by adjusting educational content to match each students needs learning speed and performance. It can also offer tutoring systems that give students more explanations, exercises and feedback outside the regular classroom. In addition, AI can handle tasks like grading, checking attendance analyzing data and other repetitive jobs. This allows teachers to spend time on teaching, mentoring and supporting students. AI can also look at amounts of educational data and find patterns that help universities plan their courses manage their institutions and make better decisions about education. However, the growing use of AI has also brought challenges that higher education institutions need to deal with. The research shows that adopting AI involves ethical organizational, economic and social issues. These include worries about privacy, ethical choices, bias in algorithms, transparency, cheating, unequal access to technology not enough technical skills, resistance from institutions and the cost of using AI. The research says that AI should not be seen as a new technology but also as a major change for institutions. This change needs the policies people, with the right skills, proper infrastructure and careful management [4] .

Artificial intelligence is a deal in higher education. One of the problems is keeping academic integrity safe. With intelligence systems that can generate things it is getting easier for students to get help with essays, assignments and other school work. Artificial intelligence can be a tool for learning but if it is used in the wrong way students might turn in work that is not really theirs. This makes it hard for teachers and universities because the old ways of testing students might not work anymore the problem is not about whether students use artificial intelligence but how they use it and if it helps them learn or just does the work for them. Universities need to make rules about what is okay and what is not okay when it comes to using artificial intelligence in school work.

At the time they need to think about new ways to test students that show they can think critically solve problems be creative and really understand the material artificial intelligence and ChatGPT are changing things. Some people like Rane and others have written about the importance of integrity when it comes to artificial intelligence and ChatGPT in education. They talk about the challenges and what we can do in the future. Universities need to find a balance, with intelligence. They need to let students use it in a way that helps them learn. Also make sure they are honest and do their own work [5]

The implementation of artificial intelligence also creates technological infrastructure and financial challenges for higher education institutions. AI-based systems require appropriate digital infrastructure, reliable internet connectivity, computing resources, data storage, software platforms, cybersecurity, and technical expertise. The literature identifies technological infrastructure as an important factor influencing AI implementation and notes that AI systems can require substantial computing resources and specialized expertise. Universities must therefore consider the financial implications of introducing AI technologies. Costs may include purchasing or subscribing to AI platforms, upgrading computer systems, improving internet connectivity, training academic and administrative staff, employing technical specialists, maintaining databases, and ensuring cybersecurity. These costs can be particularly challenging for universities with limited financial resources. The literature also recognizes that organizations may experience difficulty determining the return on investment associated with AI because some benefits may be long-term or difficult to measure. Consequently, universities need careful planning before implementing large-scale AI systems. Institutions should evaluate the educational value, financial cost, technical requirements, and long-term sustainability of proposed AI technologies. Collaboration between universities may also provide opportunities to share infrastructure, expertise, and resources. Therefore, financial planning and technological readiness should be considered essential components of responsible AI adoption [6]

2.2 Opportunities of Artificial Intelligence Integration in Higher Education

Artificial Intelligence (AI) has become one of the powerful technologies changing the way colleges and universities operate. Schools are adding AI into classes studying, testing, research helping students and managing the school. New studies show that AI can help higher education move away from one-size-fits-all methods toward personal flexible data-based and student-focused learning styles. AI tools include tutoring systems, adaptive learning websites analyzing student data, chatbots, language tools, prediction systems and AI programs like ChatGPT. A detailed study of AI in colleges found that AI is being used more and more in teaching, learning, research and running the school with lessons, smart tutoring, planning education and managing tasks being some of the main uses. Another recent study in Frontiers in Education says AI gives chances to make learning better automate tasks, help with research and make school more welcoming and easier for everyone. The studies show that AI should not be seen as a machine tool but, as a new part of how higher education is changing. Using AI can help make learning better make schools run smoothly help teachers and give students more chances to learn in their own way.. The good things depend on how AI is built, used and added to old teaching methods. New detailed studies say that AI gives results when it works with the right teaching methods and people helping instead of replacing teachers [7].

Higher education can be made better with Artificial Intelligence integration. Students are all different. Have unique needs, languages, abilities and backgrounds. The usual way of teaching does not always work well for everyone. Artificial Intelligence technologies can help make education more accessible by giving students personalized content automatically translating languages recognizing speech, generating text and doing helpful tasks. artificial Intelligence innovations in education have shown that Artificial Intelligence can help make education more inclusive and accessible. Artificial Intelligence can assist students who have trouble with languages or accessing information by giving them ways to learn. For example, Artificial Intelligence systems can change text to speech help with translation and give explanations that are tailored to each student artificial Intelligence systems can also change materials to fit the needs and progress of each student. Research on Artificial Intelligence in education has found that Artificial Intelligence can help make learning more personalized and inclusive. This can be done by changing the content automating tutoring finding difficulties early and removing accessibility barriers. This means that Artificial Intelligence can help universities create learning environments that're more flexible and recognize the diversity of students. However, this can only happen if all students have access to Artificial Intelligence technologies and if universities pay attention to the needs of different students. If universities use Artificial Intelligence with teaching methods and give the right support, they can reduce the barriers to education and help more students learn. Artificial Intelligence can provide opportunities for universities to support a wider range of students and make education better, for everyone [8].

2.3 Artificial Intelligence Integration in Educational Quality Improvement

Artificial Intelligence (AI) integration offers chances for making education better in higher education by making teaching, learning, assessment and student help stronger. Recent studies show that AI can help make education better through learning that fits each student checking work automatically helping with paperwork looking at learning data and using data to make teaching. A 2025 study that looked closely at AI and education quality in education found that AI can make education resources better make lessons fit each student make learning results better help with data about learning and make it easier to give help when students need it. This means that AI can help universities change from a system that's mostly the same for everyone to a system that changes to fit each students needs and how they do. AI tools can look at how students learn and see where they are struggling so teachers can give help where it is needed. AI can also help with checking work all the time giving feedback so students can find mistakes and get better during the learning process instead of waiting until the end of a class. Also, AI can help teachers make learning materials create questions for tests and find the parts that students have trouble with. A study done at the University of Baghdad also found that using AI methods was linked to making students feel that education services were better showing that AI can help make education better, in a university setting [9].

Artificial Intelligence can make education better by getting students more interested helping them learn on their own and making schools work efficiently. A study done in 2026 and published in the Journal of Educational Sciences found that Artificial Intelligence is being used more and more in colleges and universities to help students learn lead discussions, grade assignments and do tasks. This has been shown to make students more engaged help them learn on their own and make schools work efficiently. artificial Intelligence powered tools can give students explanations. Let them practice what they learn right away. These systems can also change what students learn based on how they are doing. This is really helpful in classes where teachers do not have a lot of

time to help each student one on one. Artificial Intelligence can help teachers by doing some tasks that they do over and over so teachers have time to do more important things like helping students, leading discussions, solving problems and doing research. a study that looked at how Artificial Intelligence helps with the goal of making sure everyone gets an education found that Artificial Intelligence can help make education better and reduce inequality. So, using Artificial Intelligence in education can make things better by not automating what we already do but by making education more personalized, responsive, efficient and focused on the students. Artificial Intelligence can really make a difference, in education by helping students learn better and making schools work smarter[10].

3. Methodology

This study will employ a quantitative research approach using a descriptive cross-sectional research design to investigate the challenges and opportunities of Artificial Intelligence (AI) integration in higher education in Somalia. Quantitative data will be collected through a structured questionnaire administered to university students and academic staff. The questionnaire will examine participants' perceptions of AI integration, particularly its opportunities for educational quality improvement, personalized learning, teaching and learning, student engagement, research productivity, assessment, and administrative efficiency, as well as challenges including academic integrity, data privacy, inadequate infrastructure, limited AI skills, financial constraints, reliability of AI-generated information, and institutional readiness. Participants will be selected using appropriate sampling techniques, including stratified and simple random sampling, to ensure adequate representation of the target population. The collected data will be analyzed using statistical techniques such as frequencies, percentages, means, and standard deviations, and where appropriate, inferential statistics will be used to examine relationships and differences among variables. The validity and reliability of the questionnaire will be ensured through expert review and pilot testing before the main data collection. Ethical principles, including informed consent, confidentiality, voluntary participation, and secure handling of collected information, will be maintained throughout the study. This quantitative methodology will enable the researcher to obtain measurable evidence regarding the challenges and opportunities of AI integration in higher education in Somalia.

4. Findings

4.1 Demographic

Question	Selection	Frequency	Percentage
Gender	Female	115	51%
	Male	109	49%
Total		**224**	**100%**
Age	Below 25 years	42	19%
	25–34 years	101	45%
	35–44 years	57	25%
	45 years and above	24	11%
Total		**224**	**100%**
Position	Student	91	41%
	Lecturer	87	39%
	ICT Staff	19	8%
	Academic Administrator	27	12%
Total		**224**	**100%**
Qualification	Bachelor's Degree	109	49%
	Master's Degree	98	44%
	PHD	17	8%
Total		**224**	**100%**
Years of Experience	Less than 2 years	113	50%
	2–5 years	71	32%
	6–10 years	32	14%
	More than 10 years	8	4%
Total		**224**	**100%**

4.2 Challenges of Artificial Intelligence Integration in Higher Education

No.	Statement	4 (SA)	3 (A)	2 (D)	1 (SD)	Mean	Std. Dev.	Interpretation
1	My university has adequate ICT infrastructure to support AI technologies.	111	78	1	34	**3.478**	**1.231**	High
2	Academic staff lack adequate AI knowledge and skills.	101	77	31	15	**2.991**	**1.046**	Moderate
3	My university lacks clear AI policies and implementation guidelines.	91	56	57	20	**3.152**	**0.910**	High
4	Students lack sufficient awareness of AI applications in education.	81	78	24	41	**3.487**	**1.050**	High
5	The cost of AI technologies is a major barrier to implementation.	71	102	34	17	**3.339**	**1.323**	High
	Overall Mean					**3.289**	**1.112**	**High**

4.3 Opportunities of Artificial Intelligence Integration in Higher Education

No.	Statement	4 (SA)	3 (A)	2 (D)	1 (SD)	Mean	Std. Dev.	Interpretation
1	AI prepares students with skills required for the future workplace.	115	56	25	28	**3.679**	**1.540**	High
2	AI supports innovation in teaching methods.	85	76	38	25	**3.393**	**1.463**	High
3	AI improves students' access to learning resources.	130	67	18	9	**3.848**	**1.347**	High
4	AI improves the quality of classroom teaching.	85	76	39	24	**3.393**	**1.454**	High
5	AI improves administrative efficiency.	91	75	38	20	**3.424**	**1.282**	High
	Overall Mean					**3.547**	**1.417**	**High**

4.4 Artificial Intelligence Integration in Educational Quality Improvement

No.	Statement	4 (SA)	3 (A)	2 (D)	1 (SD)	Mean	Std. Dev.	Interpretation
1	AI supports continuous quality improvement in higher education.	62	72	48	42	**2.835**	**1.465**	Moderate
2	AI improves communication between lecturers and students.	96	79	34	15	**3.371**	**1.235**	High
3	AI improves the effectiveness of teaching and learning.	132	67	20	5	**3.732**	**1.116**	High
4	AI enables lecturers to deliver more effective instruction.	112	78	25	9	**3.571**	**1.173**	High
5	AI supports personalized learning based on students' individual needs.	160	45	12	7	**3.929**	**1.384**	High
	Overall Mean					**3.488**	**1.275**	**High**

5. Discussion of the Finding

The findings of the study provide important insights into the challenges, opportunities, and contribution of Artificial Intelligence (AI) integration to educational quality improvement in higher education. The study involved 224 respondents, with relatively balanced gender representation, as 51% were female and 49% were male. Most respondents were aged 25–34 years (45%), while students (41%) and lecturers (39%) constituted the largest groups. Regarding educational qualifications, 49% held Bachelor's degrees and 44% held Master's degrees. Half of the respondents (50%) had less than two years of experience, indicating that the study captured the perspectives of a relatively young and developing higher education population.

The findings indicate that respondents perceived the challenges of AI integration as high, with an overall mean of 3.289. The major challenges included inadequate student awareness of AI applications (Mean = 3.487), ICT infrastructure issues (Mean = 3.478), the cost of AI technologies (Mean = 3.339), and the absence of clear AI policies and implementation guidelines (Mean = 3.152). In addition, inadequate AI knowledge and skills among academic staff was identified as a moderate challenge (Mean = 2.991). These findings suggest that although universities recognize the importance of AI, successful integration may be constrained by technological, financial, policy, and human-capacity limitations. Therefore, universities need to strengthen ICT infrastructure, provide AI training for staff and students, develop clear institutional policies, and allocate sufficient financial resources for sustainable AI implementation.

Despite these challenges, the study found that respondents perceived the opportunities of AI integration as high, with an overall mean of 3.547. The strongest opportunity was that AI improves students' access to learning resources (Mean = 3.848), followed by preparing students with skills required for the future workplace (Mean = 3.679). Respondents also agreed that AI supports innovation in teaching methods (Mean = 3.393), improves classroom teaching

quality (Mean = 3.393), and increases administrative efficiency (Mean = 3.424). These findings demonstrate that AI is viewed as a valuable tool for improving access to educational resources, supporting innovative teaching approaches, developing students' future-oriented skills, and strengthening university administration.

Furthermore, the findings show that AI has a high perceived contribution to educational quality improvement, with an overall mean of 3.488. The strongest finding was that AI supports personalized learning based on students' individual needs (Mean = 3.929), followed by improving the effectiveness of teaching and learning (Mean = 3.732) and enabling lecturers to deliver more effective instruction (Mean = 3.571). AI was also perceived to improve communication between lecturers and students (Mean = 3.371). However, its contribution to continuous quality improvement was rated moderate (Mean = 2.835), suggesting that universities may not yet have sufficiently developed systems for using AI as part of institutional quality assurance and continuous improvement processes.

Overall, the findings indicate that respondents have a positive perception of AI integration in higher education, although significant challenges remain. The opportunities and educational benefits of AI were rated higher than the overall challenges, suggesting strong potential for AI to contribute to improved teaching, learning, student support, and administrative efficiency. However, realizing these benefits requires universities to address infrastructure limitations, improve AI literacy, establish clear policies and guidelines, and provide adequate financial and institutional support. Therefore, AI should be considered not simply as a technological tool but as an important component of broader institutional and educational transformation aimed at improving the quality, accessibility, and effectiveness of higher education.

The findings of the present study are consistent with those reported by Ojha (2024**)**, who examined the opportunities and challenges associated with the adoption of Artificial Intelligence (AI) in teaching and learning in higher education. Ojha found that AI offers significant opportunities for improving personalized learning, enhancing students' learning experiences, providing timely feedback, and reducing administrative workload. These findings closely correspond with the present study, in which respondents reported high levels of agreement that AI improves students' access to learning resources (M = 3.848), prepares students for future workplace skills (M = 3.679), and supports personalized learning according to individual student needs (M = 3.929). Similarly, the present study found that AI improves the effectiveness of teaching and learning (M = 3.732) and enhances administrative efficiency (M = 3.424).

The present findings also support Ojha's identification of challenges affecting AI implementation in higher education. In particular, Ojha highlighted limitations related to technological infrastructure, training and support, and other institutional barriers. Consistent with this, the current study identified ICT infrastructure (M = 3.478), the cost of AI technologies (M = 3.339), lack of clear AI policies and implementation guidelines (M = 3.152), and inadequate AI knowledge and skills among academic staff (M = 2.991) as important challenges. Furthermore, both studies emphasize that the educational benefits of AI can only be fully realized when institutions provide adequate infrastructure, develop the necessary human capacity, and establish appropriate institutional policies and support mechanisms. Therefore, the agreement between the findings of the two studies strengthens the conclusion that AI has considerable potential to improve higher education, but its effective and sustainable integration requires strategic institutional preparation and investment [11].

6. Conclusion

The conclusion of this research is that artificial intelligence has great potential for enhancing the quality of higher education. This study found that respondents had a positive perception of the opportunities afforded by artificial intelligence in higher education, as evidenced by the overall mean of 3.547. In particular, respondents identified opportunities for artificial intelligence to improve access to learning resources, address future workplace skills needs, promote innovative pedagogical practices, improve lecture quality, and enhance administrative processes. This study also concludes that artificial intelligence contributes to quality improvement in higher education. The overall mean score for this theme was 3.488. Respondents overwhelmingly agreed that artificial intelligence promotes personalized learning, enhances teaching and learning effectiveness, enables lecturers to teach better, and facilitates effective lecturer-student interactions. This study also identified challenges for implementing artificial intelligence in higher education, with an overall mean score of 3.289. These included the absence of adequate ICT infrastructure, a lack of student awareness of artificial intelligence, the high costs of artificial intelligence, limited staff knowledge and skills in artificial intelligence, and the absence of institutional policies on artificial intelligence. This study highlights that realizing the opportunities afforded by artificial intelligence requires more than just adopting the technology. Universities need to invest in upgrading their ICT infrastructure, providing training and workshops on artificial intelligence, developing institutional policies, and allocating resources to facilitate effective implementation. Enhancing lecture quality through artificial intelligence, for instance, cannot be achieved without the necessary infrastructure. Similarly, the moderate overall mean score for continuous quality improvement in this study implies a need for universities to mainstream artificial intelligence in their quality management frameworks to achieve continuous improvement. In conclusion, this study found that artificial intelligence presents a unique opportunity and a primary challenge for higher education. Thus, universities need to pursue artificial intelligence strategically and responsibly to maximize opportunities for improving teaching and learning, enhancing personalized learning, and achieving continuous quality improvement in higher education.

1. **7. Recommendation**
2. 1. Universities must invest in enhancing ICT infrastructure including internet connection, computers, software, other technologies or equipment which will facilitate AI.
3. 2. Universities should conduct regular training sessions of AI awareness for academic staff and students which can enable them develop knowledge and skills to use AI tools proficiently.
4. 3. Universities should formulate policies and guidelines on AI use including academic integrity, privacy, ethical issues, assessment, and appropriate use of information.

5. 4. Universities must provide adequate resources to support AI acquisition, staff training, infrastructure, technical support, and sustainability.
6. 5. Universities should leverage on using AI in teaching and learning to foster personalization of learning, enhance access to education, improve on teaching, and promote innovation in teaching which were among the highest scoring emergent themes in the study.
7. 6. Universities must consider embedding AI in quality assurance and enhancement processes due to the moderate mean score attained by continuous quality improvement theme (Mean Score: 2.835). This will enable effective evaluation, learning analytics, and decision-making processes.

7. Recommendation

1. Universities must invest in enhancing ICT infrastructure including internet connection, computers, software, other technologies or equipment which will facilitate AI.

2. Universities should conduct regular training sessions of AI awareness for academic staff and students which can enable them develop knowledge and skills to use AI tools proficiently.

3. Universities should formulate policies and guidelines on AI use including academic integrity, privacy, ethical issues, assessment, and appropriate use of information.

4. Universities must provide adequate resources to support AI acquisition, staff training, infrastructure, technical support, and sustainability.

5. Universities should leverage on using AI in teaching and learning to foster personalization of learning, enhance access to education, improve on teaching, and promote innovation in teaching which were among the highest scoring emergent themes in the study.

6. Universities must consider embedding AI in quality assurance and enhancement processes due to the moderate mean score attained by continuous quality improvement theme (Mean Score: 2.835). This will enable effective evaluation, learning analytics, and decision-making processes.

Declarations

Ethics Approval:

The study was reviewed and approved by the Somali International University (SIU) Research Ethical Committee. The study was conducted in accordance with the ethical principles applicable to research involving human participants, including informed consent, voluntary participation, confidentiality, and protection of participants' information.

Author Contribution

Author Contributions StatementMMK and YEO conceptualized the study and contributed to the research design. MMK conducted the data collection, data analysis, and interpretation of the findings. MMK drafted the main manuscript text. AOA, YMA, and MKA contributed to the literature review, interpretation of the findings, and revision of the manuscript. All authors reviewed and approved the final manuscript.MMK — Mohamed Mohamud KulmiyeYEO — Yahye Elmi OsmanAOA — Abdulkadir Osman Aba SheikhYMA — Yasin Mohamed AlasMKA — Mohamed Khalif Ali

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Figures

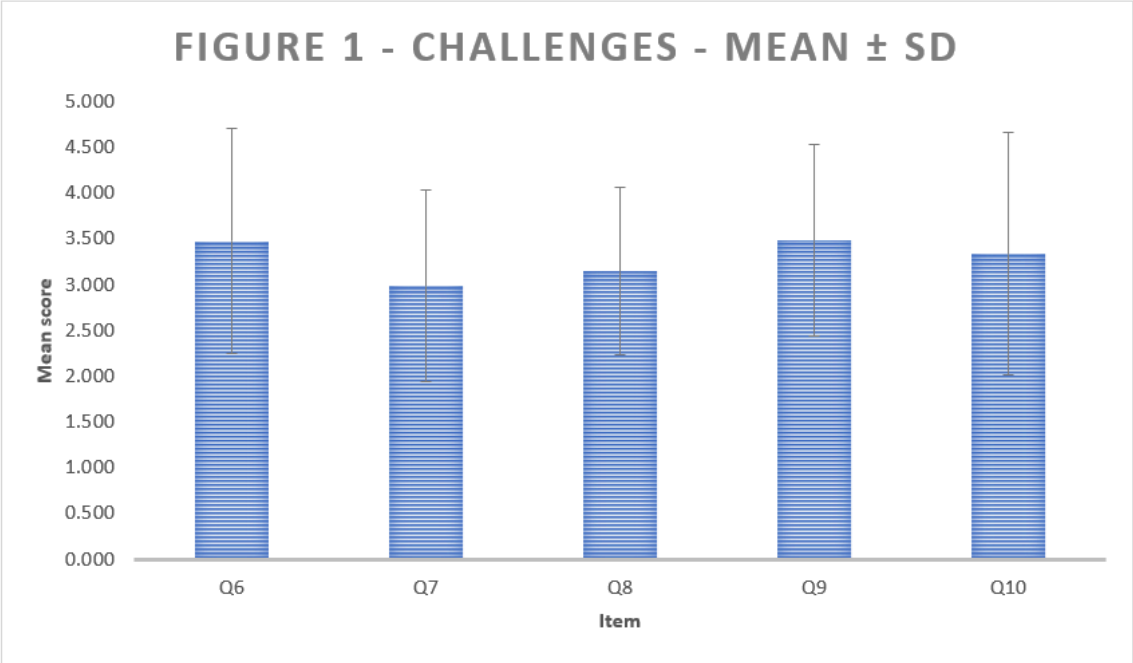


Figure 1

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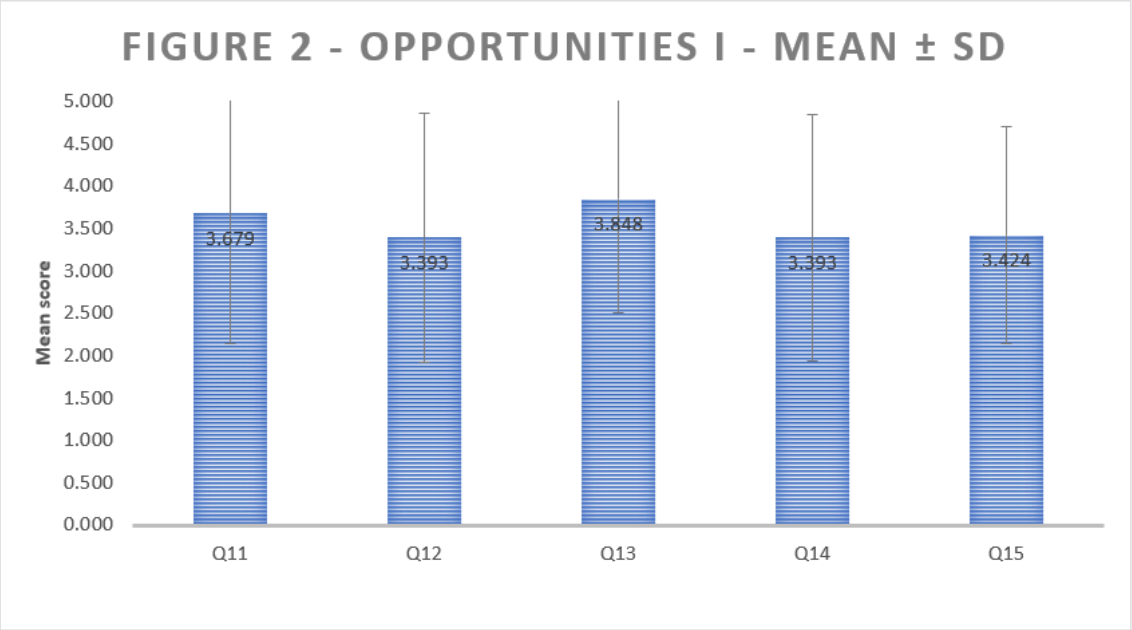


Figure 2

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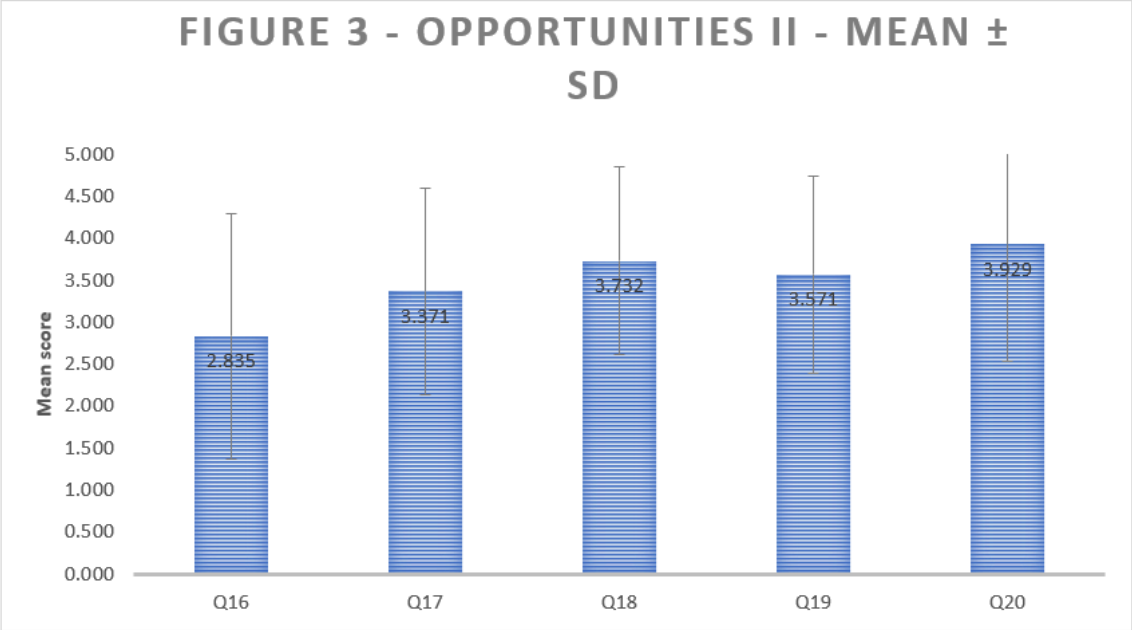


Figure 3

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