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PLANNING FOR TEACHING MATHEMATICS AND SCIENCE IN RWANDA SECONDARY SCHOOLS: STAKEHOLDER ENGAGEMENT AND EXPERIENCE SHARING THROUGH ADAPTIVE PLANNING PROCESS

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ABSTRACT

In the pursuit of improving the quality of education, the involvement of stakeholders in the planning of mathematics and science teaching and learning has been a persistent concern. To address this issue, a study was conducted to investigate how stakeholders can be engaged in the planning process for teaching mathematics and science at the secondary school level in Rwanda. The study had two main objectives: (1) to assess the current level of participation by school stakeholders in the planning of teaching and learning, and (2) to apply an adaptive planning process to engage stakeholders in planning of activities related to the teaching and learning of mathematics and science at the school level. The study used the Adaptive Planning Approach, which involves engaging stakeholders in the planning process. It was conducted in four secondary schools that were purposefully selected based on their participation in continuous professional development training programs in teaching and learning of mathematics and science. Two schools were from the rural and other two were from the urban area districts in Rwanda. A total of 44 participants, comprising 8 parents, 16 teachers, 8 students, 4 head teachers, 4 deputy head teachers, and 4 sector education officers participated in the study. Data was collected into three main stages: (1) pre-Adaptive Planning Process workshop using the interview, (2) Adaptive Planning Process (APP) workshop to assess the current engagement of stakeholders at school level and (3) plan for the activities aiming for teaching mathematics and science and (4) develop the implementation and monitoring plan for the activities planned during the APP workshop. Results demonstrate stakeholders sharing the experience, working together to formulate a vision, exploring their values, and collaboratively developing objectives towards the vision. They have also indicated a collaborative plan for the implementation and monitoring of school activities. We conclude that facilitating equitable participation among a wide range of stakeholders and taking care to include parents enriches the knowledge base from which to manage the teaching of mathematics and science process and lays a foundation for a collaborative relationship among school stakeholders. We recommend more studies of this kind to verify and generalize the findings of this research.

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INTRODUCTION

The adaptive planning approach, often used in the context of project management and strategic planning, is a dynamic and flexible method that emphasizes continuous learning, feedback, and adjustment in response to changing circumstances (Schipper et al., 2023). This approach recognizes the inherent uncertainty and complexity of many situations and seeks to adapt plans in real-time to achieve desired outcomes (Malekpour & Newig, 2020). According to these authors, the adaptive planning approach is a continuing process of action-based planning with the purpose of improving the implementation of set activities and achieving the desired goals and outcomes. In education context, the adaptive planning approach refers to a dynamic and flexible method of planning and implementing educational initiatives that emphasize continuous feedback, iterative refinement, and responsiveness to evolving student needs and contextual factors (Martins, 2008). By using the adaptive planning approach, educators design plans that are flexible and responsive to the diverse needs and learning styles of students (Su, 2012). These involve incorporating differentiated instruction strategies, offering multiple pathways to mastery, and adjusting instructional methods based on student feedback and performance.

Collaborative planning and professional learning communities provide opportunities for educators to collaborate, share best practices, and engage in collective inquiry to ensure the alignment of instructional goals and strategies across levels and subjects (DuFour & Reeves, 2016). Educators adapt teaching strategies in real-time to address the evolving needs of students and provide a structured approach to address individual student needs (van Geel et al., 2023). Adopting the adaptive planning approach in education creates an enriched learning environment that fosters stakeholders' involvement with the purpose of enhancing students' engagement, curiosity, critical thinking, lifelong passion towards learning, deeper conceptual understanding and preparing them for academic success (Akbar et al., 2023). The adaptive planning approach has the potential to make learning more engaging as knowledge is actively constructed by students (El-Sabagh, 2021).

However, planning for teaching mathematics and science has always been the role reserved for teachers and the intervention of other stakeholders such as student representatives, parents, school head teachers and deputy head teachers and the role of school owners remain unclear (Pfeiffer et al., 2021).The big challenge in this regard has always been the strategy that can be used to bring together school stakeholders. The adaptive planning process (APP) approach is appreciated to fill these gaps. It plays a big and considerable role in uniting school stakeholders, namely teachers, student representatives, parents, school head teachers and deputy head teachers by bringing them together in the collaborative development of teaching and learning strategies (Alajlani et al., 2023).

By promoting inclusive and flexibility, the APP approach engages stakeholders and ensures that the diverse perspectives and expertise of school stakeholders are considered, fostering a sense of shared ownership and commitment to educational goals (Sharma et al., 2023). The process allows for continuous feedback and iteration, enabling the school community to respond effectively to changing needs and challenges associated with teaching and learning process (Malekpour & Newig, 2020). Through regular meetings, data analysis, and transparent communication, the APP approach helps to create a dynamic and responsive educational environment that supports both students' success, educators' professional growth and development (Parnell & Gangwish, 2023).

With a particular focus on mathematics and science, there is a need to bring together school stakeholders in the collaborative planning of teaching and learning at school level. This involves administrators, teachers, parents, students, school owners and partners in a plenary dialogue to shape and refine educational strategies (Malekpour & Newig, 2020) advancing knowledge and competences development in mathematics and science by leveraging the collective expertise and insights of diversity in stakeholders. Bringing together stakeholders ensures that the curriculum and instructional methods in mathematics and science are relevant, effective, and aligned with the needs of students (Hrivnák et al., 2021). This inclusive process fosters a culture of shared responsibility and innovation, where stakeholders can contribute to the development of hands-on, inquiry-based learning experiences that engage students and enhance their critical thinking skills (Bernard et al., 2019). Moreover, through regular assessment and feedback loops, adaptive planning allows for the timely adjustment of teaching practices and resources, ensuring that the educational environment remains dynamic and responsive to the evolving demands of mathematics and science education at school level (Bernard et al., 2019; Parnell & Gangwish, 2023).

However, the implementation of the APP by bringing together school stakeholders for the planning of mathematics and science education faces several significant gaps. One major challenge is the inconsistency in stakeholder engagement, where not all voices - particularly those of students and parents - are equally heard and valued, leading to a less inclusive planning process (Motu'apuaka et al., 2015). These are added to cultural and systemic barriers that play a role, as rigid educational structures and traditional teaching methods which impede the flexibility and innovation (Arthur et al., 2023).

Furthermore, there is often a lack of continuous professional development for teachers, which is crucial for adapting to new educational demands and integrating stakeholder feedback effectively. These gaps highlight the need for a more equitable, resource-rich, and culturally responsive approach to fully enhance the teaching and learning of mathematics and science (Martins, 2008), which are solved using collaborative planning of stakeholders at school level.

In Rwanda, gaps in the processes aiming at engaging school stakeholders in the planning for school activities, particularly teaching with a special focus on mathematics and science exist. Parents and communities often face socioeconomic barriers and educational inequalities, which hinder their inclusion among other key stakeholders. Most of the time they are considered ignorant people with limited knowledge in school planning and management. Additionally, cultural factors added to the fact that some of them did not attend school impede the adoption of new planning approaches. Further, students are considered passive or ignored stakeholders and not engaged in planning of school activities. Overcoming these challenges requires a concerted effort to encourage greater community engagement to support the improvement of mathematics and science education.

This is where the APP approach is needed to fill the gaps. It was used to assess and to improve stakeholders' participation in planning school activities with special focus on mathematics and science. The study was guided by the following research questions: (1) To what extent are school stakeholders involved in planning and teaching of mathematics and science activities in Rwanda secondary schools? (2) How can the APP approach be used to improve stakeholders' participation in planning school activities? Findings of this study are significant to the teaching, particularly mathematics and science. First, it outlines the opinions and viewpoints of stakeholders, namely school administrators, students' leaders, and parents about the process of planning educational activities with a particular focus on teaching and learning mathematics and sciences. Second, because Rwanda Ministry of Education may decide to set guidelines, procedures, and standards for systematically engaging stakeholders in planning school activities, this study has an impact on education policy as it offers a framework to carry out the same kind of research in education.

METHODOLOGY
The APP framework was used to engage stakeholders in planning school activities following three main steps:

Stage 1: It consisted of identifying schools having teachers trained in teaching mathematics and science under the continuous professional development program. This is because they have enough skills to use innovative teaching and learning methodologies for mathematics and sciences. This was followed by the identification of key stakeholders. Having them on board, an interview was organized at school level about participatory engagement in teaching and learning mathematics and science. These stakeholders included school head teachers, deputy head teachers in charge of studies, representatives of mathematics and science teachers, representatives of parents, representatives of students from the combinations having mathematics and science subjects, and the sector education officers from the sector (administration unit) where the school was located.

Stage 2: In stage two, all stakeholders who participated in stage one were invited to a one-day workshop organized at the neighboring and more accessible schools. Stakeholders coming far from the school where the workshop took place were facilitated for the transport. The lunch was given to all stakeholders for the purpose of time management and smooth running of the workshop. The half day of the APP workshop was used for the experience sharing about the current participatory engagement of stakeholders in the planning of school activities and of teaching mathematics and science particularly. Every participant was given time to share individual experience with others.

Stage 3: This was done in the second half-day of the APP workshop. Based on the gaps identified in stages 1 and 2, stakeholders have agreed on the values guiding them for their effective engagement in planning school activities. Further, they came together and planned the school vision and set objectives for improving the teaching and learning in general, with a special consideration of mathematics and science subjects at school level. Objectives were classified from simple to complex, based on the time needed for its implementation. Further, they have planned the monitoring time to assess the progress of the implementation of planned activities.

RESEARCH DESIGN AND DATA COLLECTION
Data were collected from four purposively selected secondary schools, 2 from Kigali City and 2 from the rural districts, in Southern Rwanda. These schools provided a balanced representation of both urban and rural educational settings, where 44 participants, comprising 8 parents, 16 teachers, 8 students, 4 head teachers, 4 deputy head teachers, and 4 sector education officers participated in the study.

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The diversity of participants was intended to provide a comprehensive understanding of the educational context and perspectives across different roles of stakeholders within the schools planning of teaching and learning activities with a special focus on mathematics and science.

Stage 1: interview with stakeholders - Schools were identified, and school head teachers were contacted using the phone call to make an appointment to present and explain the purpose of the study. After securing the appointment, the school visit was done by a research team to identify key stakeholders who were later invited for the interview by the school head teacher one week before using a written invitation letter and reminders through a phone call. The interview took place at the school level in the before noon hours. Before the interview, an explanation about research and its purpose were given to the interviewees. In addition, they were informed that participation is voluntary, hence withdraw from the study was allowed once the interviewee feels not interested. The interview was centered on the participatory engagement of stakeholders in planning for teaching and learning activities with special focus on mathematics and science. We used pre-designed semi-structured interview that was reviewed by experts in mathematics and science education from the University of Rwanda and tested outside of the sample size. Data were recorded by taking notes or by video recording depending on the preference of the respondent.

Stage 2 data collection - Stakeholders who participated in the first stage were invited in one day workshop at one of the schools concerned by the study. They were invited one week before and during holidays to avoid conflicts with the teaching schedules. The first ½ day of the workshop was about the participatory engagement of stakeholder during the planning for teaching activities with special focus on mathematics and science at school level. As participants were coming from different schools, each school was given a separate room to facilitate brainstorming on how participatory engagement in planning of school activities is done at their schools. Each group selected the team leader and the secretary to guide the discussion and make a report from the group. Before starting the discussion, a facilitator from the research team provided explanations about the purpose of the discussion and assured confidentiality. Further, he/she called for power dynamic management and epistemic justice to respect, give time and voice to each participant in the discussion. The questionnaire to guide the discussion was prepared in advance and validated during the pilot study outside of the sample size. A plenary session was organized at the end of the group discussion to share experience and to learn from each school through the presentation of outcomes from the discussion. The session was facilitated by a member from the research team and data were collected by taking notes from the presentation, discussion and by collecting all presentations.

Stage 3 data collection - Based on the problems identified at school level and by using the experience from other schools, each school used the second ½ day for improving the ways used to plan for teaching mathematics and science at school level. At first point, they discussed values that guide them as stakeholders, formulated one vision and objectives guiding the school activities, identified the gaps in planning for teaching and learning mathematics and science and then developed the activities to fill the gaps. Outcomes were written on manila papers and flip charts. After the discussion, a plenary session was also organized for knowledge sharing, where each school could make updates for a better vision, objectives and planned activities. Data were collected by taking notes form the discussion, and presentations from each group.

Data analysis

The collected data were transcribed to create a comprehensive, organized document for analysis. Each document was then thematically analyzed using the Taguette open-source software for qualitative data analysis (Rampin & Rampin, 2021) and Microsoft Excel. These tools facilitated the development of a codebook and identification of themes, which were subsequently used to calculate frequencies, percentages, means, and to plot histograms. Taguette and Excel were chosen for their functionality in organizing, annotating, collaborating on, analyzing, and visualizing the research findings effectively. A qualitative approach was employed in this research to gain an in-depth understanding of the types of activities recommended by stakeholders regarding the planning of mathematics and science instruction at the school level. Details on the coding and thematic organization of the compiled data from the interview and the workshops are presented in Table 1.

Table 1: Codes for data collected by category of participants and schools

Participants and code	School 1 (KB)	School 2 (CY)	School 3 (EM)	School 4 (KV)
Teacher Biology(T1)	KBT1	CYT1	EMT1	KVT1
Teacher Chemistry (T2)	KBT2	CYT2	EMT2	KVT2
Teacher Mathematics (T3)	KBT3	CYT3	EMT3	KVT3
Teacher Physics (T4)	KBT4	CYT4	EMT4	KVT4
Student representative (S1)	KBS1	CYS1	EMS1	KVS1
Student representative (S2)	KBS2	CYS2	EMS2	KVS2
Parent (P1)	KBP1	CYP1	EMP1	KVP1
Parent (P2)	KBP2	CYP2	EMP2	KVP2
School leader (SL)	KBSL	CYSL	EMSL	KVSL
School Deputy Leader (DL)	KBDL	CYDL	EMDL	KVDL
Sector Education Inspector (EI)	KBEI	CYEI	EMEI	KVEI

Results
Stage 1: Results from pre-intervention assessment
Results provided insights into the participation levels of students, teachers, parents, school leaders and Sector Education Inspectors (SEIs) in the planning of school activities (Figure 1). Notably, school leaders, parents and SEIs are the most stakeholders involved in the planning of teaching and learning activities. The participation of teachers is relatively low, while it is much lower for students. Concerning the planning of teaching and learning activities, teachers and headteachers participate the most, while the participation of students, parents and SEIs remains relatively small. A higher level of participation in the planning of teaching and learning mathematics and science at school level was exhibited by school leaders, remains low for parents, SEIs and teachers.
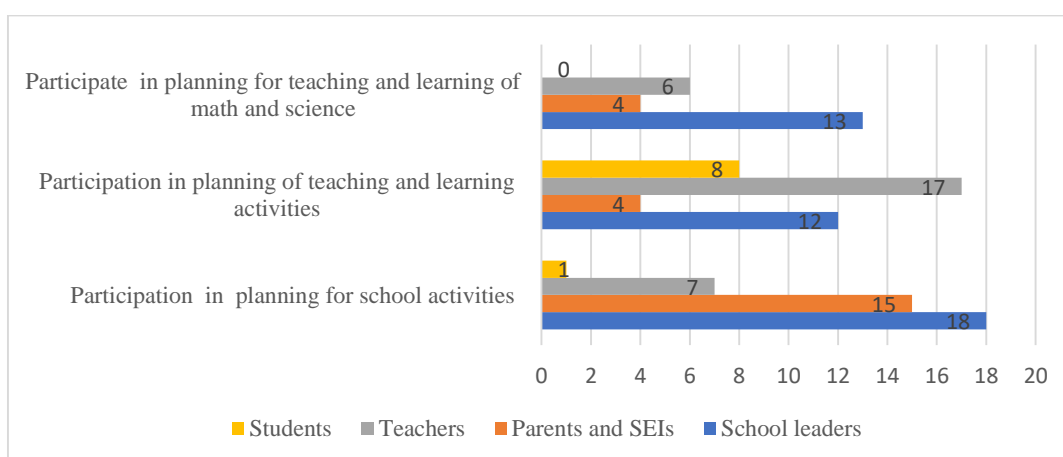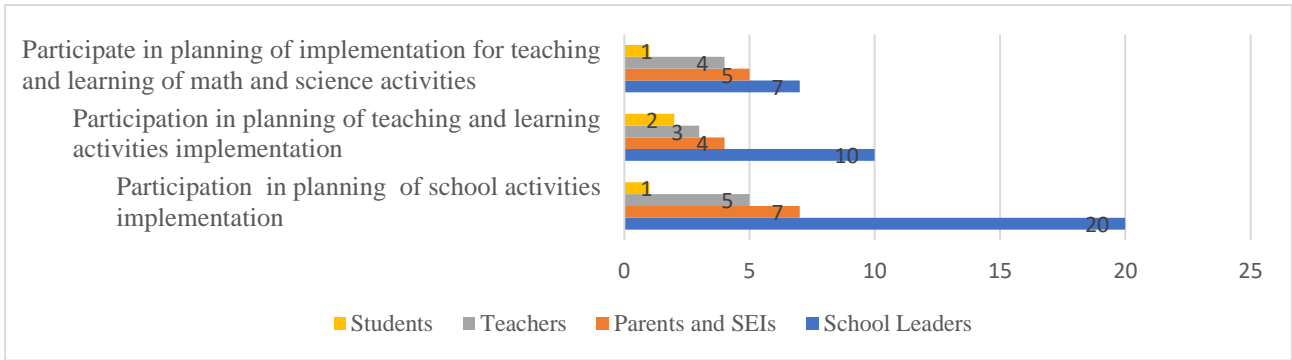

Figure 1: Stakeholders' participation in the planning of school activities (source: Primary data)

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School leaders mainly have the main role in planning for the implementation of school activities compared to the role played by teachers, students, parents and SEIs (Figure 2).

Figure 2: Stakeholders participation in planning for the implementation of school activities

Results from stakeholders' interviews about their participation level in planning for the follow-up of the implementation of school activities including teaching and learning all subjects and mathematics and science particularly, results indicated that school leaders participate the most in the planning of the follow-up compared to the role played by other stakeholders (Figure 3).
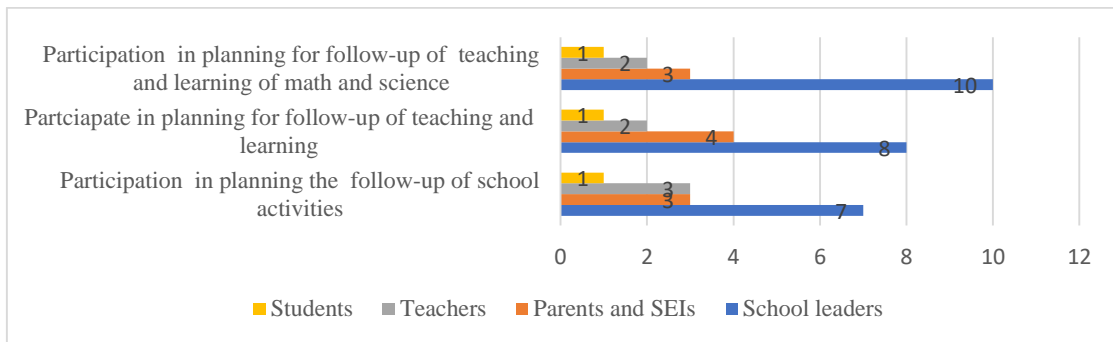
Figure 3: Stakeholders participation in planning of the follow-up of school activities

Further results have indicated that school leaders are satisfied by the level of planning of school activities. However, they have indicated that they are not satisfied by stakeholders' participation in the teaching and learning of math and science, implementation of school activities and follow-up of the implementation of planned school activities. This was also reported by students, parents, teachers and SEIs who participated in this study (Figure 4).
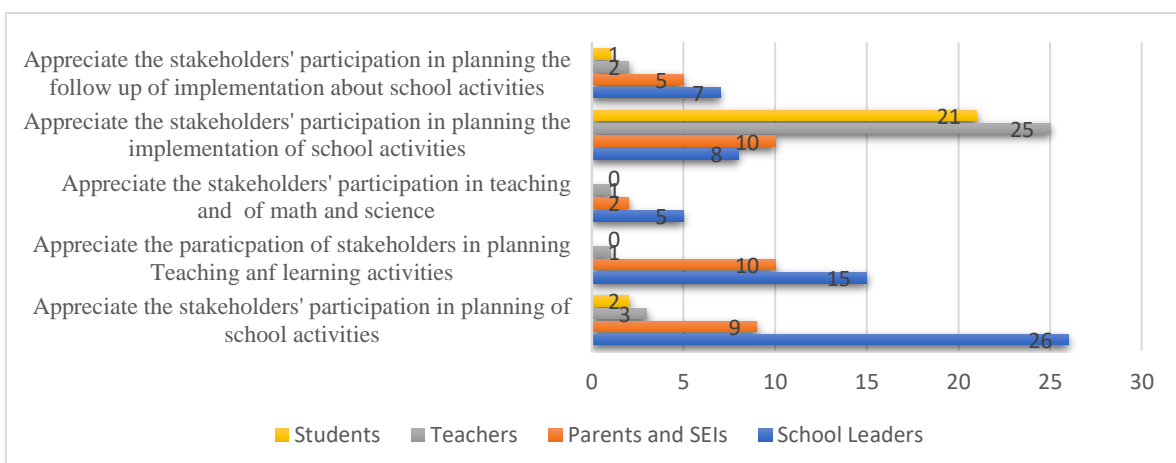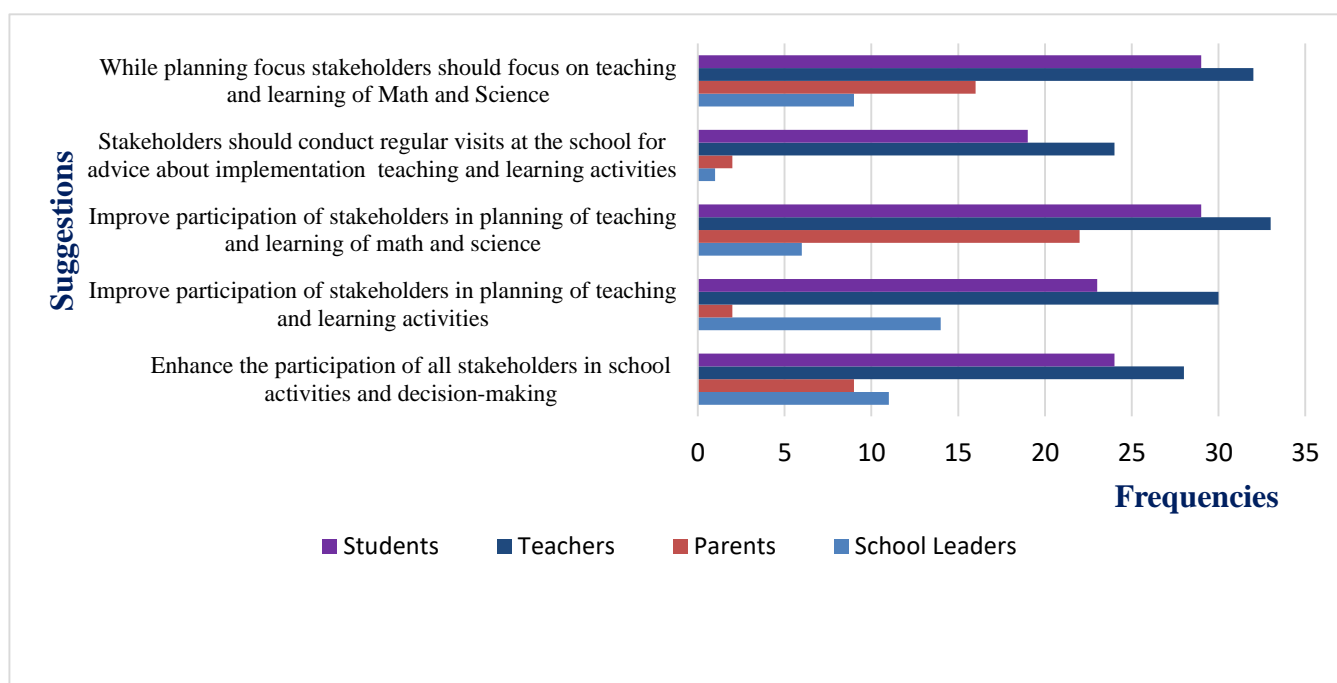

Figure 4: Stakeholders' appreciation level in the participation of schools' planning

Stage 2: Result from the Adaptive Planning Approach workshop

At the end of the workshop, stakeholders who participated in the workshop agreed that planning of school activities was not effectively done. They have decided to improve the way it was done. The attitudes mentioned to guide them in the process include flexibility, integrity, honesty, consistency, passion, accountability, responsibility, equity, collaborative, communicative, transparency. Even tough each school had a vision, during the plenary session, they have agreed to have one common vision: "Work together towards quality education". The set objectives were different, but by reflecting on their level of participation in planning for school activities, planning for implementation, and planning of the follow-up of the implementation of planned activities.

Results have showed that they understand what should be effective participation in planning of school activities. They have suggested what must be done for effective participation in planning school activities (Figure 5). The enhancement of the participation of all stakeholders in school activities and decision-making

has emerged as a most frequent suggestion from all stakeholders mainly students and teachers who participated in this study, who have also strongly suggested the improvement of stakeholders' engagement and participation in planning for teaching and learning mathematics and science at school level. One of the SEIs has replied that: "While planning, stakeholders should focus on teaching and learning mathematics and science and stakeholders should conduct regular visits at the school to assess the implementation of planned activities".

At the end of APP workshop, students, teachers, parents, and SEIs suggested that school leaders need to be flexible and consider other stakeholders in the planning process. One of the teachers mentioned that: "I assume that if my involvement was considered in planning for implementation, many biology practical activities could be budgeted accordingly. This is because when I request materials, school head teacher always told me that there is no budget for that" (KBT1). Frequencies about the suggestions on participatory engagement of stakeholders during the planning of school activities are detailed in Figure 6.

Figure 5: Stakeholders' suggestions to improve their participation in school planning activities

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Figure 7 illustrates the suggestions made by stakeholders to improve their participation level in planning the follow-up of school activities. The most occurring suggestion is to improve the involvement of stakeholders in the planning of the follow-up of school activities, mainly teaching and learning activities with a particular attention on teaching and learning of math and science. In addition to that, they proposed that during the planning process, committees in charge of the follow-up of the implementation of the resolutions of the meeting should be nominated and should include representatives of school stakeholders in various categories.
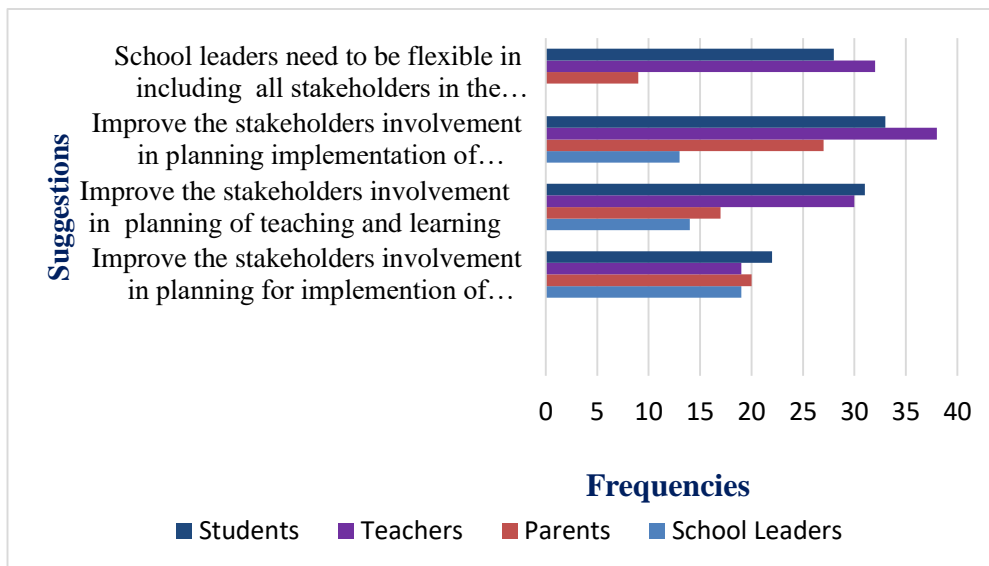

Figure 6: Stakeholders' suggestions about planning for implementation
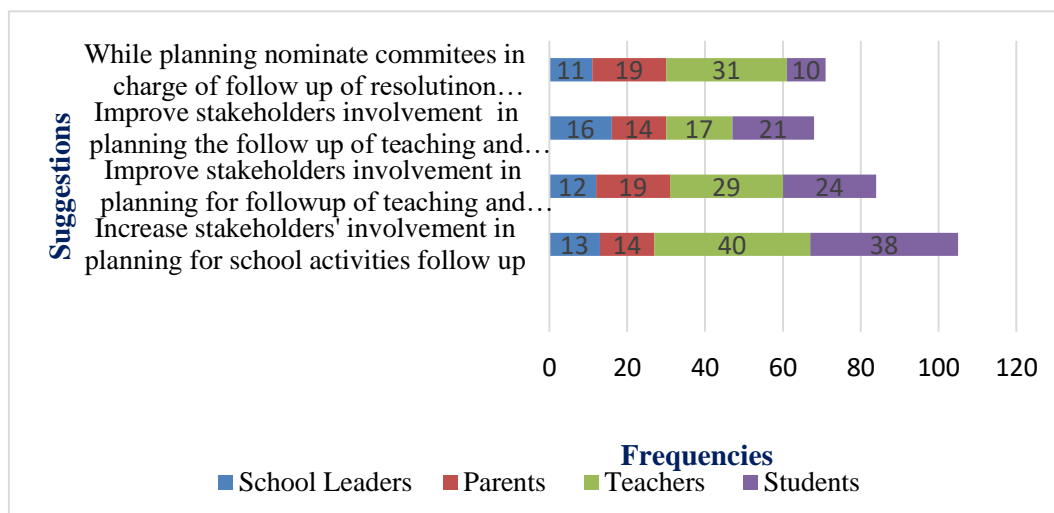

Figure 7: Stakeholders' suggestions on planning for the follow-up

Stage 3: Stakeholders' strategies to achieve the implementation of planned activities

Stakeholders proposed several strategies to achieve the implementation of planned activities. These include to establish clear definitions of tasks, roles, and responsibilities of each stakeholder, creation of coordinating committees and subcommittees, raising awareness among stakeholders about the importance of focusing on participation in planning for teaching and learning math and science, conduct a special meeting about teaching and learning mathematics and science, conduct needs assessment before planning school activities, establishing systematic monitoring and evaluation mechanisms, and creating opportunities to regularly meet and share ideas (Figure 8).
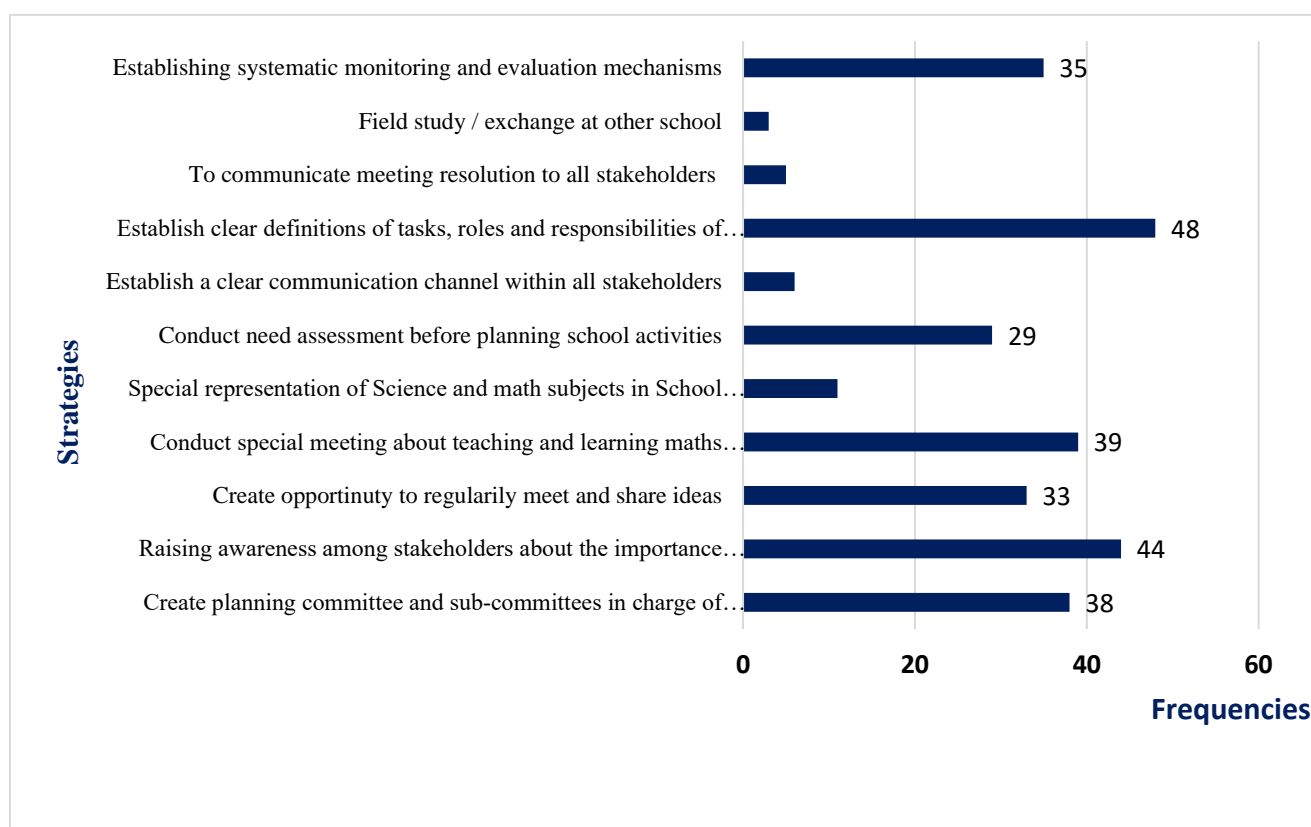
Figure 8: Strategies to achieve the implementation of suggestions taken.

DISCUSSION

The participation of stakeholders in planning school activities is crucial. It contributes to a proficient and effective educational environment. Based on the results of this study, except for school leaders, the participation of other stakeholders in the planning of school activities, planning of implementation, and participation in the planning of follow-up of school activities is low. This low participation in planning might have resulted from diverse factors including a lack of awareness among stakeholders, poor communication, lack of invitation to participate from the school authorities, and lack of ownership and willingness to participate in planning. Once stakeholders are not conscious of the school activities and planning processes or, when they do not know the importance of their input, they may not be interested in school activities. Without clear communication about how their participation in planning can impact school's positive outcomes in terms of students' learning, performance, and well-being, stakeholders may not be engaged. Stakeholders' invitation by school authorities to participate in the planning of school activities shows good collaboration and involvement in school activities. Once it is not done, there is a creation of uncertainty among stakeholders which limits the participation.The low level of participation of stakeholders in planning school activities, planning of implementation, and planning how school activities implementation will be well-

monitored tells that school leaders are the only school's activities planners. In addition, it tells that such schools face different challenges, such as reduced school teaching effectiveness, poor implementation of planned activities, monitoring, evaluation and working networks. As an inconvenience, this may result in stakeholders like students and teachers feeling excluded from school plans which may reduce interest in teaching and learning activities thus leading to students' poor learning outcomes as it was noted by Mamokhere & Meyer, (2022) about the consequences of inadequate involvement of stakeholders in school planning processes on teaching and learning outcomes.

Furthermore, the study by Pihillegedara & Kumari, (2021) indicated that stakeholders claimed low participation in school planning activities. However, the findings were found to be dissimilar to the study by Guzman, (2022) who noticed a great participation of stakeholders in planning school activities. Cabardo, (2016) and Kaswahili et al., (2023), confirmed a moderate level of stakeholder participation in the preparation of the school's strategic plan and school activities. Besides, the findings of a study in the Philippines noticed a high participation of stakeholders in school strategic planning. Lacanilao, (2020), realized in his study that teachers, students, and parent stakeholders highly participate in the planning of school activities. However, in agreement with this study, Lacanilao, (2020) attests the over-

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participation of school leaders in the planning of school activities which is in relation with the findings of this study where head teachers are played the main role. The implication is that across countries, there is a variability of stakeholders' participation level in the planning of school activities, which involves the planning of implementation of teaching and learning activities, teaching and learning of mathematics and science, and planning of follow-up of school activities implementation as well as the implementation of meeting resolutions. This variability denotes the difference in school experience and performance as the high participation level of stakeholders in planning school activities reduces various challenges and contributes to its effectiveness and success (Gamede & Uleanya, 2021) . Moreover, findings highlight the potential issue of school leaders' dominance over other stakeholders in Rwandan secondary schools that participated in the study. This participation dominance influences the planning process, suppresses the contributions of other stakeholders, and affects the inclusiveness of planning.

Though the teachers showed more acceptance to participate in the planning of teaching and learning activities than others, they did not participate in planning for implementation and follow-up of these activities and more to that, they do not appreciate their participation level in the planning of teaching and learning of mathematics and science. This tells that as the regular workforce of the school with important responsibilities to implement the key school activity of teaching and learning, they are only involved in planning teaching activities in general with no particular focus on their role to plan for how teaching will be implemented and how the follow-up should be conducted. It tells also that they are more involved in planning lesson content to teach, teachers' documents, and other teaching and learning activities but not in the planning for better teaching and learning process of math and science. These findings align with Ke et al., (2019), whose study revealed that the frequency found does not mean participation level but rather the collective lesson planning.

The high appreciation level of school leaders that stakeholders participate in planning different school activities at a good level contracts with the low appreciation level of other internal stakeholders such as students, teachers parents, and sector education inspectors (SEI) who revealed that they do not appreciate their participation level in the planning of school activities, planning for implementation and planning of the follow-up both in terms of school activities in general, teaching and learning in general and teaching and learning of math and science. This contraction indicates that either school stakeholders may not know the meaning and value of their involvement in the planning process of school activities or school leaders may not have the strategic skills to understand the meaning and role of stakeholders' involvement in schools' planning and

hence this leads to the failure of engaging stakeholders.

These findings agree with others in the study by Kaswahili et al., (2023), that school head teachers, while planning for the school strategic plan, invite few stakeholders. However, they deviate from findings in the study by (Cruzat et al., 2022), where from the interview, stakeholders strongly appreciated that the "school involves various stakeholders in planning, implementing, and evaluating the school operations. In addition, they appreciated that in formulating school policy, the school invites representatives of every group of stakeholders. This low level of stakeholders' participation in school planning marks a scarcity of training for school stakeholders to build their leadership collaborative skills and this advises an intervention by adaptive planning approach that shows to every stakeholder its contribution to the planning process and teaches leaders to start planning at a team level to avoid uncertainties in the future (Kato & Ahern, 2008; Malekpour & Newig, 2020). Its implementation in Rwandan schools that participated in this study and the schools in the country in general, may bring a positive change in stakeholders' involvement in planning school activities. The overall suggestion taken at high frequency by all stakeholders except school leaders, after training on the adaptive planning approach is to improve stakeholders' involvement in different types of planning in schools. This implies that school authorities do not realize that other stakeholders' participation in school planning activities is neglected and that they act as the only active stakeholders in planning for school activities. The same implication was noted by (Lacanilao, 2020) who also found that school head teachers are the most active in planning school activities. These suggestions agree with many other studies' recommendations to improve stakeholders' involvement in the planning of all school activities (Gamede & Uleanya, 2021; Guzman, 2022; Kaswahili et al., 2023; Lacanilao, 2020).

The request addressed to school leaders to be flexible in including all stakeholders in the planning process indicates the existing limited opportunities for other stakeholders except school leaders and to participate in the planning of school activities. This suggestion shows that through the training, stakeholders have understood their role in participating in school's activity planning. Among others building awareness, strong communication, and definition of tasks will lead to proper strategies to improve stakeholders' involvement through the adoption of adaptive planning approaches.

CONCLUSION
Results show that the level of stakeholders' participation in planning of school activities is still low in Rwandan secondary schools.

Therefore, there is a need to devise various strategies that would help to integrate all stakeholders in the school's planning and the APP was proven to be a better approach that would be used by school leaders to ensure a proper integration of the identified stakeholders among other teachers, students, parents and SEIs. The involvement of these stakeholders in the school's planning would ensure an improved school performance with a very special attention put on the teaching of maths and science.

REFERENCES

Akbar, K. F., Damanik, F. H. S., Juliana, J., Akib, A., and Wibowo, F. I. S., 2023. Inclusive Education Practices: Fostering an Accessible Learning Environment for Diverse Learners. Global International Journal of Innovative Research, 1(3), 227–232. https://doi.org/10.59613/global.v1i3.35

Alajlani, N., Crabb, M., and Murray, I., 2023. A systematic review in understanding stakeholders' role in developing adaptive learning systems. Journal of Computers in Education, 11, 901–920. https://doi.org/10.1007/s40692-023-00283-x

Arthur, M., Saha, R., and Kapilashrami, A., 2023. Community participation and stakeholder engagement in determining health service coverage: A systematic review and framework synthesis to assess effectiveness. Journal of Global Health, 13:04034. https://doi.org/10.7189/JOGH.13.04034

Bernard, R. M., Borokhovski, E., Schmid, R. F., Waddington, D. I., and Pickup, D. I., 2019. Twenty-first century adaptive teaching and individualized learning operationalized as specific blends of student-centered instructional events: A systematic review and meta-analysis. Campbell Systematic Reviews, 15(1–2), e1017. https://doi.org/10.1002/cl2.1017

Cabardo, J. R. O., 2016. Levels of participation of the school stakeholders to the different school-initiated activities and the implementation of School-Based Management. Journal of Inquiry and Action in Education, 8(1), 2016.

Cruzat, M., Cruzat, A. P., and Javillonar, M. G., 2022. The school and its stakeholders: partners in building a strong school community. International Journal of Multidisciplinary Research and Growth Evaluation, 45, 314–318.

DuFour, R., and Reeves, D., 2016. The futility of PLC lite. Phi Delta Kappan, 97(6), 69-71. https://doi.org/10.1177/0031721716636878

El-Sabagh, H. A., 2021. Adaptive e-learning environment based on learning styles and its impact on development students' engagement. International Journal of Educational Technology in Higher Education, 18, 53, 2021. https://doi.org/10.1186/s41239-021-00289-4

Gamede, B. T., and Uleanya, C., 2021. Review of the Impact of Stakeholders' Participation in Rural School Education. Multicultural Education, 7(5), 18–25. https://doi.org/10.5281/zenodo.4734190

Guzman, J. C., 2022. Stakeholders' Participation in School Improvement Plan and Schoolperformance of Secondary Schools. International Journal of Arts, Sciences and Education, 3(51), 51–66.

Hrivnák, M., Moritz, P., Melichová, K., Roháčiková, O., and Pospišová, L., 2021. Designing the participation on local development planning: From literature review to adaptive framework for practice. Societies, 11(1), 19. https://doi.org/10.3390/soc11010019

Kaswahili, S., Catherine, N., and Timothy, M., 2023. Levels of Involvement of Educational Stakeholders in Preparation of Strategic Plans in Enhancing Selected Aspects of Organizational Performance in Public Secondary Schools in Arusha Region. British Journal of Education, 11(10), 14–32.

VENUSTE NSENGIMANA, HENRIETTE MANISHIMWE, VEDASTE MUTARUTINYA, RUTH NTIHABOSE, CLAUDE KAREGEYA, JOSEPH NZABAHIMANA, INNOCENTE UWINEZA, JOSIANE MUKAGIHANA AND PASCASIE NYIRAHABIMANA

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Kato, S., and Ahern, J., 2008. "Learning by doing": Adaptive planning as a strategy to address uncertainty in planning. Journal of Environmental Planning and Management, 51(4), 543–559. https://doi.org/10.1080/09640560802117028

Ke, Z., Yin, H., and Huang, S., 2019. Teacher participation in school-based professional development in China: does it matter for teacher efficacy and teaching strategies? Teachers and Teaching: Theory and Practice, 25(7), 821–836. https://doi.org/10.1080/13540602.2019.1662777

Lacanilao, R. T., 2020. Stakeholders' Participation in School Activities in Public Secondary Schools in Los Baños, Laguna. Asian Journal of Social Sciences and Management Studies, 7(3), 208–218. https://doi.org/10.20448/journal.500.2020.73.208.218

Malekpour, S., and Newig, J., 2020. Putting adaptive planning into practice: A meta-analysis of current applications. Cities, 106, 102866. https://doi.org/10.1016/j.cities.2020.102866

Mamokhere, J., and Meyer, D. F., 2022. Comprehending stakeholders' involvement in the integrated development planning process as a tool for improved community participation. EUREKA: Social and Humanities, 4, 18–32. https://doi.org/10.21303/2504-5571.2022.002426

Martins C, F. L. C. E., 2008. An Adaptive Educational System for Higher Education. Proceedings of the 14th EUNIS, 8.

Motu'apuaka, M., Whitlock, E., Kato, E., Uhl, S., Belinson, S., Chang, C., Hoomans, T., Meltzer, D., Noorani, H., Robinson, K., Anderson, J., Paynter, R., Guise, J.-M., and Cottrell, E., 2015. Defining the benefits and challenges of stakeholder engagement in systematic reviews. Comparative Effectiveness Research. 215(5), 13—19. https://doi.org/10.2147/cer.s69605

Parnell, R.A., Gangwish, A., 2023. Effective Collaborative Decision-Making Includes Stakeholder Analysis and Communication. In:

Gosselin, D. (eds) A Practical Guide for Developing Cross-Disciplinary Collaboration Skills. AESS Interdisciplinary Environmental Studies and Sciences Series. Springer, Cham. https://doi.org/10.1007/978-3-031-37220-9_6

Pfeiffer, A., Bezzina, S., Dingli, A., Wernbacher, T., Denk, N., and Fleischhacker, M., 2021. Adaptive learning and assessment: from the teachers' perspective. INTED2021 Proceedings,1, 375-379. https://doi.org/10.21125/inted.2021.0103

Pihillegedara, S. P., and Kumari, H. M. L., 2021. School-based planning and the contribution of stakeholders in developing the re-opened schools. Interdisciplinary Research in Education IRSFOE 2021, 261–269.

Rampin, R., and Rampin, V., 2021. Taguette: open-source qualitative data analysis. Journal of Open-Source Software, 6(68), 3522. https://doi.org/10.21105/joss.03522

Schipper, T.M., Goei, S.L., de Vries, S., 2023. Dealing with the Complexity of Adaptive Teaching through Collaborative Teacher Professional Development. In: Maulana, R., Helms-Lorenz, M., Klassen, R.M. (eds) Effective Teaching Around the World. Springer, Cham. https://doi.org/10.1007/978-3-031-31678-4_32

Sharma, A., Thakur, K., Kapoor, D. S., and Singh, K. J., 2023. Designing Inclusive Learning Environments: Universal Design for Learning in Practice. In C. Calhoun (Ed.), The Impact and Importance of Instructional Design in the Educational Landscape (pp. 24-61). IGI Global Scientific Publishing. https://doi.org/10.4018/978-1-6684-8208-7.ch002

Su, S.W., 2012. The Various Concepts of Curriculum and the Factors Involved in Curricula-making. Journal of Language Teaching and Research, 3(1), 153-158. https://doi.org/10.4304/jltr.3.1.153-158

van Geel, M. et al., 2023. Adapting Teaching to Students' Needs: What Does It Require from Teachers? In: Maulana, R., Helms-Lorenz, M., Klassen, R.M. (eds) Effective Teaching Around the World. Springer, Cham. https://doi.org/10.1007/978-3-031-31678-4_33