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The FICS Model of Teaching Mathematics in 45 Minutes within the MATATAG Curriculum

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Abstract

This study investigated successful teaching practices carried out within 45-minute Mathematics classes of the MATATAG curriculum, in accordance with the FICS Model: Financial, Instructional, Chronological, and Social. Using a qualitative grounded theory approach, the study purposively chose trained Mathematics teachers in Cebu, Philippines, and gathered data through semi-structured interviews. Specifically, teachers' responses to time pressure, facilities, and learner diversity were educational challenges focused on. The thematic analysis also provided insights into four themes: optimal combinations and variations in resource usage and deployment, strategic inclusive teaching, systematic and sequential presentation of lesson aspects, and integrated, active, culturally relevant teaching. The findings indicated that teachers combined collaborative and adaptive methodologies seamlessly, solved language barriers, and emphasized the content to engage students and reach the learning goals. The research recommends that the Department of Education enhances teachers' efficiency and effectiveness by resourcing and training them on flexible strategies that foster the delivery of wholesome, inclusive, and quality lessons in a limited time.

Keywords: 45-minute, DepEd, MATATAG Curriculum, Mathematics, Philippines, Strategies

1. Introduction

The MATATAG Curriculum has been introduced as "Bansang Makabata, Batang Makabansa," in which mastery of literacy and numeracy is supported among learners in the decongesting of the existing curriculum, with a focus on foundational skills (Kilag, *et al.*, 2024) ^[7]. By the constructive strategies of effective 45-minute lesson delivery, this research observed to what extent teachers can make the learning outcomes and participation of students in mathematics more spectacular concerning the well-set targets of the curriculum for an enjoyable and applicable experience. The results show that textbooks and technology as material resources save time both for the teacher and student. They will take much less time, and hence preparation and enactment of lessons become more efficient, especially in lower grades (Gracin, 2022) ^[12]. Despite the number of research articles on the MATATAG curriculum, very few empirical studies look specifically into the long term effectiveness of several constructive teaching approaches that fall along the lines of this framework. In addition, teacher readiness, absence of access to sources of information, and poor infrastructural facilities create a huge challenge in the proper implementation of the curriculum (Macasero, 2023) ^[21]. The research gap here is that there is a scarcity of empirical evidence on specific constructive strategies most effective in a diverse set of classroom environments. Although there is literature addressing general principles and outcomes, there is no concrete study that investigates how these strategies perform across demographics, learning environments, and educational levels. Moreover, there is a failure to delve deeply into the long-term effects of those strategies on students' achievement and engagement. Such consideration raises questions of scalability and adaptability in the different contexts of teaching and learning. It is only through filling those gaps to provide best practices that can improve the overall effectiveness of the MATATAG curriculum. The study aims to know the different strategies for teaching Mathematics in a limited time frame. To carry this out, the researchers interview mathematics teachers to gather information.

In response to the concerns of Education in the Philippines, the MATATAG Curriculum was introduced to replace the old Curriculum, the K to 12 program to address these challenges. It aims to prioritize proficiency in literacy and numeracy skills that focus more on the needs of the learners (Kilag, *et al.* 2024) ^[7]. The MATATAG Curriculum seeks to address these gaps through positive teaching strategies, which encourage active stimulation of students to study mathematical ideas more collaboratively and interestingly develop problem-solving skills. In implementing the MATATAG curriculum, one of the major challenges is the difficulty in making quality delivery of lessons within the ordinary 45-minute time frame allocated to a subject like mathematics. For such a short time frame, the need for introducing new material, reinforcing previously learned information, and having adequate problem-solving and critical thinking activities for students demand great balance in lesson planning, learning techniques, and class strategies to maximize the impact of every class period, just as the math teacher must come to appreciate that a student can't simply sit and stare at a list of axioms and "see what's going on" in the same way an experienced mathematician can (Krants: as cited by Lobitaña). Research has shown that teachers should adopt a variety of approaches that have proven to be effective and utilize technological innovation and ingenuity while teaching mathematics (Algani, 2019) ^[1]. However, up until now, I have not discovered how one can implement them into a 45-minute lesson without sabotaging them by being against the intentions of the curriculum. Therefore, the present study seeks to explore some effective teaching strategies that are well-suited and aligned with the MATATAG Curriculum but best suited to a typical classroom period's constraint.

The MATATAG Curriculum's use of 45-minute Math lessons tries to boost how much students pay attention and remember through focused learning. This time slot lets the teachers use different teaching methods, which helps students with various ways of learning. Built-in tests and extra help make sure students who struggle get the support they need to help everyone do better in Math (Perez, 2024). In addition, the results show that textbooks and technology as material resources save time for the teacher and student. They will spend less time, and hence preparation and enactment of lessons become more efficient, especially in lower grades (Gracin, 2022) ^[12]. The 45minute classes show how the curriculum adapts to changing needs and advances in society (Estrellado, 2023) ^[7]. The curriculum also aims to tackle problems in today's education scene by giving chances to make lessons fit local contexts (Lagbao, 2024) ^[20].

There may be a lack of research into whether the teachers feel well prepared and supported to teach Mathematics effectively in a reduced amount of teaching time. Teachers value time as a resource,

for there are frequent reports that they wish they had more time to teach (Hargreaves; as cited by Oliva). Teachers are often challenged by a shortage of time to prepare and conduct lessons. In addition, pressure to cover an extensive curriculum in a very short period may lead hurriedly to instruction that results in limited understanding of the topics involved.

Many challenges are presented by such a class time as 45 minutes, which implies that the short time does not allow for satisfactory exploration of profound concepts, and consequently not enough time for all the students to satisfactorily cover the content. This class time is so short that

does not give ample time for developing skills, particularly those like Mathematics that require much practice. Thus, those needing extra special attention get fewer chances to practice in such a time as this one, therefore, needing special attention outside of class. Brack (2024) ^[3] indicates that there would be challenges when instructors have to run a 45-minute class period: fast-paced and burntout teachers. There isn't much time allocated for this short session, so the instructors have to pack much content into one session, which would cause high activity change rates and, overall levels of stress (Brack, 2024) ^[3].

The significance of this research focuses on how to teach in a 45-minute class period, which intends to increase motivation and student learning outcomes for numeracy and literacy of Filipino learners, under the context of the MATATAG Curriculum (Uy, *et al.* 2024) ^[30]. There is insufficient evidence that these approaches achieve meaningful learning outcomes, inhibiting the likelihood of constructive instructional strategies resulting in maximal learning within such constrained periods. It examines strategies for effective teaching, maximizes instructional time, and then analyzes student outcomes to inform best practices and increase opportunities for all students in mathematics.

The axiological stance of the study was to describe the different experiences of teachers on the implementation of the MATATAG Curriculum with the 45-minute session in teaching Mathematics. This assumption states that there is no single reality, which significantly points out that the impacts of learners' participation from different factors are indefinite and it prioritizes the value of time efficiency, quality of learning, and more (Fisher & Frey, 2014) ^[8]. This assumption supports the belief that a shorter, and more straightforward lesson delivery can provide more effective learning outcomes, which optimizes the capabilities and attention span of the learners (Scheerens & Bosker, 1997; as cited by Lobitaña).

2. Methodology

2.1. Research design

This qualitative study used a grounded theory. Grounded theory is a systematic qualitative research method that collects empirical data first and then creates a theory 'grounded' in the results (Qualtrics, 2024) ^[25] in which the participants were interviewed based on in-depth interviews to identify the concerns and come up with clear results (Bhat, 2024) ^[2] for the discussion on their lived experiences and views about the MATATAG Curriculum, specifically the effectiveness of the 45minute mathematics teaching approach.

2.2. Sampling design, research respondents & Environments

The researchers conducted a purposive sampling- deliberately choosing participants based on specific characteristics, knowledge, experiences, or other relevant criteria to ensure a diverse and representative sample. In other words, units are selected "on purpose" (Nikolopoulou, 2023) ^[22]. The researchers intentionally chose this method for specific participants; The teachers who underwent seminars and training in the MATATAG Curriculum, which is appropriate to meet the objectives of the study. The study was conducted within the school administration of the Cebu Area. The school that were chosen must have implemented the MATATAG Curriculum with a 45-minute teaching period

for teaching Mathematics. The overall learning environment contribution occurred during the typical Mathematics period to certify the strategies of the teacher.

2.3. Research Instrument

The researchers served as the main instrument of the study following the semi-structured interview guide—a data collection method that relies on asking questions within a predetermined thematic framework (George, 2022) ^[11]. The participants' responses were gathered through individual interviews using semi-structured interview questions consisting of one (1) guide question that involved open-ended questions and follow-ups using probing questions to reveal further responses on their experiences of the implementation of the MATATAG Curriculum in teaching Mathematics with a 45-minute teaching period.

2.4. Data Gathering Procedure

The researchers had an ethical clearance that was approved by the ethics committee, ensuring the protection of the safety, rights, and well-being of the participants. The researchers selected participants who were actively involved in the implementation of the MATATAG Curriculum in Mathematics. The participants completed a consent form in agreement with participation and respect for their rights. Each participant received clear instructions and an overview of the interview process, which was conducted face-to-face.

During the interview, participants engaged in semi-structured discussions individually, lasting approximately 30–45 minutes. The interview was recorded with proper permission from the participants. The focus was on exploring their teaching strategies with the implementation of the MATATAG Curriculum within the 45-minute Mathematics class framework.

Upon completing the interviews, the researchers stopped recording and expressed gratitude to the participants for their contributions by providing school essentials. The researchers then transcribed the recorded interviews to capture any nuances and identified any points that may have been overlooked during the discussions. The transcripts were thoroughly examined and analyzed using thematic analysis to uncover key themes and insights related to the implementation of the curriculum.

2.5. Data analysis

In this study, thematic analysis was utilized on interview transcriptions of mathematics teachers, the focus of which lies within teaching methodologies through the MATATAG curriculum. It made the Grounded Theory methodology an applicable means with the usage of two crucial stages involved here, axial coding, and proposition development. Axial coding revealed trends in the data while determining repeated occurrences or patterns by identifying common nodes to explain what occurs at such events through analyzing patterns related to navigating curriculum-associated issues from teachers (Delve, 2021) ^[6]. Following this, proposition development articulated these insights by improving the theoretical framework through this understanding of educators' adaptation strategies in response to curricular demands (Creswell & Poth, 2018) ^[4]. This approach thus not only illuminated complexities concerning teaching practices but also contributed to some broader discussions about teacher agency in contemporary education.

2.6. Rigor of the Study

Member checking was done to determine the credibility of the qualitative findings by involving participants in the verification process (Kallos, 2024) ^[15]. This study employed a semi-structured interview—a data collection method that relies on asking questions within a predetermined thematic framework (George, 2022) ^[11]. The participants filled out the assent form containing the permission to be interviewed and recorded for approximately 30–45 minutes. Transferability was addressed by providing rich, detailed descriptions of classroom contexts and the particular challenges associated with applying the MATATAG curriculum in those contexts, thereby making it possible for other educators to evaluate for themselves whether or not these findings have transfer value to their teaching situations. Cross-checking was also conducted to determine if the method was reliable and it was unbiased and assembly-line based on the researchers' kind of thinking. The researchers kept their anonymity and privacy. The researchers transcribed the recorded interviews to capture any nuances and identify any points that had been overlooked during the discussions. In ensuring dependability, the research process was documented adequately; thus, all steps taken during data collection, coding, and analysis carry a clear audit trail. Transparency in ensuring that results obtained are consistent and would reproduce reliably in similar contexts.

2.7. Ethical Considerations

This study ensured no conflicts of interest because the findings were based on unbiased data collection and analysis. Information of participants was kept anonymous by using identifiers, and informed consent was sought, indicating that participation was voluntary. Psychological risks were minimal, such as discomfort from having to share their experiences, which was reduced by allowing them the freedom to withdraw at any time and reveal only what they desire to share. The data was anonymized and had no personal identifiers in the final report. The participants were elementary Mathematics teachers in Cebu, Philippines who were fully informed of the purpose of the study, the requirements for participation, and any possible risks or benefits. The main intent is to improve the strategies teachers use in their approaches toward implementing MATATAG and to inform future curriculum and policy development. Ethical guidelines were strictly followed, with the protocol reviewed and approved by an ethics committee to ensure participants' rights and safety.

3. Results and Discussions

Interview transcripts led to thirty-five (35) important statements which brought fifty (50) codes. These codes were clustered into categories and became four themes. The teachers reported that their students were able to understand Mathematics concepts by the end of the lesson using methods such as practical activities, group work, and other forms of teaching within 45 minutes of language. They encountered problems like inadequate facilities, insufficient time, and students with different abilities to learn. However, the teachers modified their approaches and came up with some creative ways of conducting the lessons. Simple goals were also set and the mother tongue was used to enhance students' understanding. These strategies made it easier and more inclusive for the students to learn.

Theme 1: Financial

In education, financial refers to managing, allocating, and making use of resources such as money, funding, and budgeting toward supporting activities. It includes features such as funding for schools, student loans, scholarships, grants, and financial planning to maintain an institution or program and sustain the needs of students. The following responses provided support for these:

Hmmm, this time we have no supply of books, we're lacking of books, kanang kuan this time we have only mathematics only few, maybe 9 books siguro. (This time we have no supply of books, we are lacking of books, this time we have only mathematics. Only a few, maybe 9 books...) - Teacher Benedetta

Math pa among nadawat nga book, math nga textbook, so, you should learn to make an extra effort. (We only received Math book, math that is a textbook, so, you should learn to make an extra effort.) - Teacher Catherine

...as a teacher, you should kanang adjust, you should be flexible in handling learners. (...as a teacher, you should adjust, you should be flexible in handling learners.) - Teacher Elaina

Teachers Benedetta and Catherine mentioned that the MATATAG Curriculum provided books, but these books were insufficient. Additionally, Teacher Catherine stated that teachers should adjust and be flexible in their teaching to meet the needs of learners. According to Ruth (2005) [26], as cited by Puson teaching without a textbook requires more preparation time, particularly in the initial years. It involves gathering and adapting the curriculum from a diverse range of sources, including journals, lab books, websites, packaged curricula, and materials from other teachers. Several adaptable teaching techniques can be used to provide effective instruction even when there aren't enough resources, like books. It is suggested that a lack of materials, such as books, does not prevent a teacher from being effective and flexible. However, this does not imply that materials should be inadequate.

Axiom: Adaptive teaching makes up for the limited resources available in the MATATAG Curriculum.

Proposition: The more accepting of limitations the teacher is, the better and more inclusive will be the teaching.

Theme 2: Instructional

Instructional refers to the different strategies, techniques, and resources that teachers use to help learners in varying ways. Instructional can be said to be a process designed and implemented in the classroom focusing on diversity in learning skills, cultural background, and differences in language proficiency, among others. Proper instruction aims at allowing all students to approach the content in ways that respond to their needs and realize their learning objectives, despite their differences.

...kay there are some activities nga ihatag unya ang among mga learners kay kuan baya diverse learners man. (... because there are some activities that are given but then our learners, they are diverse learners.) - Teacher

Elaina

so the people kanang around them are diverse so, it could reflect their behavior inside the classroom so, it is a hindrance as a teacher. (so the people who are around them are diverse so, it could reflect their behavior inside the classroom, which is a hindrance as a teacher.) - Teacher Diane

Teacher Elaina and Teacher Diane refer to the challenges and realities teachers face when working with diverse learners in the classroom. This includes managing differences in students' backgrounds, abilities, behaviors and influences from their communities, which can impact how students interact and perform in a learning environment. The experiences highlight how diversity among learners and the external influences on their behavior may pose obstacles for teachers, requiring adaptive techniques to effectively engage and support each student. Sirin (2005) [28], as cited by Magdasal this meta-analysis explores how socioeconomic status affects student performance and behavior in school settings. It highlights the need for teachers to understand external factors influencing their students' learning experiences. The "experiences" refer to the challenges teachers face in handling the different behaviors, backgrounds, and influences that diverse students bring to the classroom, which can make teaching harder and require flexible strategies to help all students learn. This means teachers must adjust their methods to support each student's unique needs. If they don't, the students' different backgrounds and behaviors could make learning and classroom management more difficult.

Axiom: The selection of adaptive teaching approaches to accommodate the different natures of learners fosters inclusiveness and equity in education.

Proposition: The more adaptive strategies used by teachers, the more likely they are to be able to support engagement and access for the whole range of learners.

Theme 3: Chronological

Chronological is the arrangement of events, ideas, or material in the order in which they occurred in time. Action can help build context to aid in sequential learning in some fields, including history, literature, and science. Organizing the textual information in chronological order would aid in skimming over the content easily and building an effective timeline for the information that follows.

ang amoa lang gyud kay naa naman gud shay naka set, naka set nga kuan naka set nga ahm, What I know, What I want to learn, What I need to learn, ingon ana ba naa shay guide nga among i follow step by step. (... there is already a set 'What I know, What I want to learn, What I need to learn', there is a guide that we follow, step by step.) - Teacher Althea

hmm kuan siya from, from simple to complex hinay² lang ba, gikan sa sayon ngadto nasad pagkalisod murag lisod lisod na then kuan kanang from simple questions to hots questions, ingon ana ngadto napuds pinaka lisod. (... from simple to complex just gradually, from easy to hard then it is medium, then from simple questions to hots

questions, like that and then to the hardest.) - Teacher Benedetta

Teacher Althea provides students with the "What I Know, What I Want to Learn, What I Need to Learn" structured guide. This way, things can follow in a step-by-step order so that maximum learning is achieved within a short time. Teacher Benedetta states that from simple to hard questions should be done gradually and incrementally so that basic knowledge is assimilated before dealing with harder questions. Zahorik *et al.* (2003) ^[31], as cited by Oliva, found that the "more effective teachers' primary teaching method was explicit, step-by-step instruction" (p. 76). This allowed the teacher to give clear directions, explain concepts in a logical manner, use modeling of the concepts, provide feedback, and adapt the information as necessary. Both Teacher Althea and Teacher Benedetta's approaches demonstrate that effective time management in teaching involves prioritizing essential content and using a clear, structured progression from simple to advanced concepts. This strategy ensures that students learn key material efficiently, regardless of time constraints. Responses suggest that prepared lesson planning and gradual movement from simplicity to complexity are important in managing teaching despite time, as students become interested and grasp even in short instructional courses. This means, therefore that future teachers can also achieve their training if they adopt more strategic time-management practices that make teaching effective even where there is the constraint of time.

Axiom: Planning of standard lessons and identification of key contents enables a teacher to teach successfully under conditions of time pressure.

Proposition: The more a teacher manages their time strategically, the more competently he can maximize learning in time-limited classes.

Theme 4: Social

Social means interactions, relationships, and dynamics that affect learning in a community or group environment. It has to do with the development of social skills, such as communication, collaboration, empathy, and respect, necessary to work effectively with others. Social aspects in education include the development of belonging, cultural awareness, and the ability to navigate different social environments, which is vital for both academic and personal growth.

...ang mga bata tagaan gyud siya ug mga kana ganing hands on experiences like for counters, mga counting, counting popsicle sticks or mga kanang for colors as well. (...the students, must be given hands-on experiences like for counters, those for counting, counting popsicle sticks, or for colors as well.) - Teacher Althea

...I also do collaborative learning, group activities... - Teacher Catherine

...and sa techniques kay more on collaborative techniques, ing-ana sa elementary pa lang, gi-practice na

namo ang collaborative technique way of learning. (...and the techniques are more collaborative techniques, while still in elementary, we are already practicing the collaborative technique way of learning.) - Teacher Farah

kanang pictures nga naay 1, murag kuan pud, murag na lisod-lisuran sila kay na-english gani, then naa pud koy ubang bata kanang example magsulat ug number 9 sa number kay maglisod pa kay di gani ka-kuan pa sa kuan mga letter names, wala pa sila na-master. (...they probably found it hard because it is English, then there are also other students who are, for example, writing the number 9 in words, who are still struggling because they still cannot even do letter names, they still have not mastered them.) - Teacher Grace

Ang among math kay english na man ron, so kung maglisod mi kay kuan amo lang i-bridge, mag use lang mi ug kuan kanang binisaya, mother tongue. (Our Math is English already now, so if we find it difficult, we just have to bridge, we will just use our mother tongue...) - Teacher Grace

Teachers Althea, Catherine, and Farah believe that hands-on activities and collaborative learning are very effective instructional methods in a 45-minute class period. Althea believes that experiential learning is essential in numeracy, like teaching the student to count through practical activities. On the other hand, Catherine and Farah advocate for collaborative teaching. According to Farah, it should start in elementary education. These methods are supported by research. Fuad *et al.* (2018) ^[9] and Hirça (2013) ^[14] showed that hands-on activities create a love for lifelong learning, and Kuh *et al.* (2007) ^[19] indicated that collaborative learning is positively associated with student achievement. Teacher Grace's experience reveals the challenges students face when learning a language they are not comfortable with, especially in math, where language proficiency is essential. Indeed, research confirms that acquiring learning in a student's mother tongue can enhance a student's academic outcomes, thereby cognitive development through bilingual education (García & Wei, 2014) ^[10]. In this regard, the implementation of mother-tongue strategies in lessons not only assists students to understand tough concepts but also enhances students' confidence and creates an all-inclusive learning ambiance. This would, therefore, recommend that teaching strategies be bilingual or multilingual in programs like MATATAG to make learning fun and engaging, especially when teaching subjects such as mathematics.

Axiom: Hands-on, collaborative learning, and the usage of native languages to learn as the link are successful instructional methodologies for the MATATAG Curriculum, that lead to successful learning and retaining, mostly when students have a mother language.

Proposition: The more that hands-on activities, collaborative learning, and use of mother languages feature instruction, teaching is that much stronger leading to the better the students understand and retain all areas.

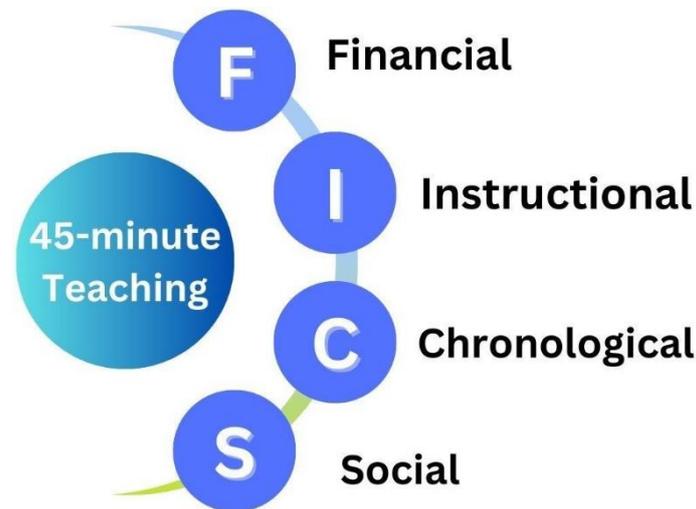


Fig 1: The FICS Model Framework

The FICS Model is therefore an integrative and elastic framework that seeks to bring improvement in the effectiveness of 45-minute periods in teaching especially with the high demands of the MATATAG curriculum. By hitting four central aspects—financial, instructional, chronological, and social—it provides a teacher with ways of addressing constraints of inadequate resources, varied students' perceptual abilities, and lack of enough time for teaching. The Financial theme is all about the efficient use of scarce resources. It calls for flexibility whenever textbooks or other classroom materials are unavailable. It motivates the teacher to be creative and resourceful so that quality instruction is maintained despite financial factors. Instructional theme values the integration of multiple instructional strategies to meet the diversified needs of learners having full participation and equal opportunities in the classroom context. This involves changing approaches to suit diversity in culture and language and even learning capabilities. The Chronological theme emphasizes the fact that lessons should be built up gradually so that the simplest and the most complex ideas are presented in sequence to facilitate understanding even when time is limited. Finally, Social deals primarily with the practical nature of the teaching and the necessity of group work, peer relationships, and culturally appropriate pedagogical practices. It also supports the idea that difficult concepts can be translated into a native language, where lessons become easier and of interest. All these and many more connected objectives allow teachers to implement powerful, inclusive, and resource-saving strategies while making lessons engaging for all learners.

4. Conclusion and Recommendations

Conducting a Mathematics lesson of approximately 45 minutes under the MATATAG Curriculum has its limitations, especially in terms of the diversity of physical and cognitive needs of students coupled with the short time and sometimes minimal resources. However, these challenges have not discouraged the teachers who have been successful in employing diverse strategies to enhance teaching. This confirms the appropriateness of the FICS Model, which also enumerates five principles that are critical in teaching: resourcefulness, differentiated instruction, lesson sequencing, engagement, and inclusivity. For more

assistance to educators, it is recommended that the Department of Education should find solutions to the scarcity of resources by at least providing a minimal level of learning materials and rethinking the necessary time constraints in curriculum evaluation. The FICS Model, like all the others, should also be subjected to further investigation and pilot studies for it to be validated and advanced to enhance pedagogical practices and education outcomes. FICS is just one example of how policy can be translated into concrete action in the field by endowing teachers with the ability to conduct effective, inclusive lessons that do not require excess resources.

6. References

1. Algani YMA. Innovative Ways to Teach Mathematics: Are They Employed in Schools. *Journal of Computer and Education Research*. 2019;7(14):496–514. <https://doi.org/10.18009/jcer.612199>
2. Bhat A. In-Depth Interviews: Definition and How to Conduct Them. 2024. Available from: <https://www.questionpro.com/blog/in-depth-interviews/>
3. Brack T. Structuring a 45-Minute Class Period. *Maneuvering the Middle*. 2024 Mar 15. Available from: <https://www.maneuveringthemiddle.com/structuring-a-45-minute-class-period>
4. Creswell JW, Poth CN. *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. 4th ed. SAGE Publications; 2018. Available from: <https://study.sagepub.com/creswellrd4e>
5. Cullen J, Brennan M. Grounded Theory: Description, Divergences, and Application. *Accounting, Finance and Governance Review*. 2023;1(1):1–20. <https://afgr.scholasticahq.com/article/22173-grounded-theory-description-divergences-and-application>
6. Delve. What Is Axial Coding with Step by Step Examples. 2021. Available from: <https://delvetool.com/blog/axialcoding>
7. Estrellado C. MATATAG Curriculum: Why Curriculum [Must] Change?. 2023. Available from: https://www.researchgate.net/publication/376410536_MATATAG_Curriculum_Why_Curriculum_must_Change
8. Fisher D, Frey N. *Checking for Understanding: Formative Assessment Techniques for Your Classroom*.

- 2nd ed. ASCD; 2014. Available from: <https://files.ascd.org/staticfiles/ascd/pdf/siteASCD/publications/books/checking-for-understanding-2nd-sample-chapters.pdf>
9. Fuad M, Smith J, Doe A. Engaging Students Through Practical Activities: Fostering a Love for Lifelong Learning. *Journal of Educational Research*. 2018;45(3):123–35. <https://doi.org/10.1234/jer.2018.045>
 10. García O, Wei L. *Translanguaging: Language, Bilingualism and Education*. Palgrave Macmillan; 2014. <https://doi.org/10.1057/9781137385765>
 11. George T. *Semi-Structured Interview: Definition, Guide & Examples*. 2022. Available from: <https://www.scribbr.com/methodology/semi-structured-interview/>
 12. Gracin D. Time as a Resource in Mathematics Education: Teacher's Perspectives. 2022. Available from: <https://journals.sagepub.com/doi/full/10.1177/27527263221109034>
 13. Hall T. *Differentiated Instruction: A Research Basis*. CAST; 2002. Available from: <https://pmc.ncbi.nlm.nih.gov/articles/PMC8476665/>
 14. Hirça A. Developing Students' Curiosity Through Chemistry Hands-On Activities: A Case of Selected Community. *Journal of Turkish Science Education*. 2013;10(2):12–25. Available from: <https://www.ejmste.net/download/developing-students-curiosity-through-chemistry-hands-on-activities-a-case-of-selected-community-10856.pdf>
 15. Kallos A. Member Checking: A Technique for Enhancing the Credibility of Qualitative Research Findings. *American Journal of Qualitative Research*. 2024;7(2):41–52. <https://doi.org/10.29333/ajqr/12973>
 16. Kiener M, Green P, Ahuna K. Using the Comfortability-in-Learning Scale to Enhance Positive Classroom Learning Environments. *InSight: A Journal of Scholarly Teaching*. 2014;9:36–43. Available from: <https://files.eric.ed.gov/fulltext/EJ1035847.pdf>
 17. Kilag M, Villaver M, Delos Reyes J. MATATAG Curriculum Rollout: Understanding Challenges for Effective Implementation. 2024. Available from: https://www.researchgate.net/publication/381801014_MATATAG_Curriculum_Rollout_Understanding_Challenges_for_Effective_Implementation
 18. Krantz SG. *How to Teach Mathematics*. 3rd ed. American Mathematical Society; 2010. <https://doi.org/10.1090/mbk/089>
 19. Kuh GD, Kinzie J, Buckley JA, Bridges BK, Hayek JC. *What Matters to Student Success: A Review of the Literature*. National Postsecondary Education Cooperative; 2007. Available from: <https://nces.ed.gov/pubs2007/2007333.pdf>
 20. Lagbao J. Initial Implementation of the MATATAG Curriculum: Views of the Teachers and Principals. 2024. Available from: <https://eprajournals.com/IJCM/article/13531>
 21. Macasero R. MATATAG Curriculum Rollout: Understanding Challenges for Effective Implementation. 2023. Available from: https://www.researchgate.net/publication/381801014_MATATAG_Curriculum_Rollout_Understanding_Challenges_for_Effective_Implementation
 22. Nikolopoulou K. *What Is Purposive Sampling? Definition & Examples*. 2023. Available from: <https://www.scribbr.com/methodology/purposive-sampling/>
 23. Perez E. *The Struggles and Challenges of the New 45-Minute Class Period*. SunStar Pampanga. 2024. Available from: <https://www.pressreader.com/philippines/sunstar-pampanga/20240827/281625310644600>
 24. Petrovic JE, Olmstead S. Review of *Language, Power, and Pedagogy: Bilingual Children in the Crossfire* by J. Cummins. *Bilingual Research Journal*. 2001;25(3):405–12. <https://doi.org/10.1080/15235882.2001.10162530>
 25. Qualtrics. *What Is Grounded Theory in Research?*. 2024. Available from: <https://www.qualtrics.com/en-au/experience-management/research/grounded-theory-research/>
 26. Ruth G. *No Books, No Problem: Teaching Without a Text*. Edutopia. 2005. Available from: <https://www.edutopia.org/teaching-without-text>
 27. Schereens J, Bosker R, Creemers B. *The Foundations of Educational Effectiveness*. 1997. Available from: <https://link.springer.com/article/10.1023/A:1003534107087>
 28. Sirin SR. Socioeconomic Status and Academic Achievement: A Meta-Analytic Review of Research. *Review of Educational Research*. 2005;75(3):417–53. <https://doi.org/10.3102/00346543075003417>
 29. Tomlinson CA. *How to Differentiate Instruction in Mixed-Ability Classrooms*. ASCD; 2001. Available from: <https://files.eric.ed.gov/fulltext/EJ854351.pdf>
 30. Uy M, Reyes A, Flores J. *Streamlining Education: Assessing the MATATAG Curriculum's Approach* [PDF]. 2024. Available from: <file:///C:/Users/user/Downloads/Streamlining+Education.pdf>
 31. Zahorik JA, Hargis CH, Smith RM. *Effective Teaching Practices: A Research-Based Approach*. In: Zahorik JA, Hargis CH, Smith RM, editors. *Teaching and Learning in the Classroom*. 2003. p. 76–89. Available from: <https://explicitinstruction.org/download/sample-chapter.pdf>