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Predictors of Science Process Skills among Grade 7 Learners in A Remote Learning Setup

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ABSTRACT

This study evaluated the quality of science self-learning modules the Department of Education (DepEd) provided. It examined their impact, parental support, and teacher engagement on the development of science process skills among Grade 7 learners in a remote learning setup. The study aimed to identify key predictors of effective module use and their influence on learners' skills. A statistically significant regression model ($F = 4.76$, $p = 0.001$) revealed that attainability of objectives, content appropriateness, and presentation were critical factors, with a combined explanatory power of 8.81%. Engagement and feedback from teachers emerged as crucial, while motivation and instructional quality had less impact. Parental support significantly correlated with learners' science process skills, particularly in educational engagement and motivation. The study used a combination of quantitative methods, analyzing data from surveys and assessments to evaluate module quality and its effects. The results underscored the importance of well-designed self-learning modules and active involvement from both parents and teachers. In conclusion, the findings highlight the need for improved module quality, increased parental support, and enhanced teacher engagement to foster scientific inquiry and skill development among learners. An intervention program is proposed to address these areas. Future research should adopt a mixed-methods approach to uncover deeper insights and contextual factors influencing science education. The study emphasizes a comprehensive strategy involving multiple stakeholders to enhance science process skills and support effective science education in remote learning environments.

Keywords: *science self-learning modules, parental support, teacher engagement, grade 7 learners, remote learning, science process skills*

INTRODUCTION

Science process skills are essential for inquiry-based learning but pose challenges in remote education, particularly during the modular distance education approach adopted by the Department of Education. At Romblon National High School and throughout the District of Romblon, science literacy levels, measured by the mean percentage score (MPS) from 2017 to 2020, fell below the acceptable threshold of 75% (DepEd, 2020). Recent data from 2022 to 2023 shows some improvement, yet the MPS remains below the threshold at only 44.80% (DepEd, 2023). The shift to distance education has further exacerbated difficulties in acquiring basic science process skills.

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Learners face numerous obstacles in remote education, including the absence of direct instructor assistance and limited feedback mechanisms, which hinder effective learning (Aldhafeeri & Alotaibi, 2022). Additionally, many parents lack the expertise to provide instructional support at home, compounded by busy work schedules and inadequate subject knowledge (Dolbin-MacNab et al., 2023). The lack of face-to-face classes also deprives learners of essential interactions necessary for acquiring knowledge, skills, and values, especially in remote areas where additional barriers exist.

The COVID-19 pandemic has necessitated a shift to remote learning, highlighting significant challenges in maintaining educational quality. This shift has underscored the limitations of current educational resources and methodologies, making the need for effective remote learning strategies more urgent.

This study is situated within Romblon National High School and the broader District of Romblon, where remote learning has revealed significant deficiencies in science education. The geographical and cultural

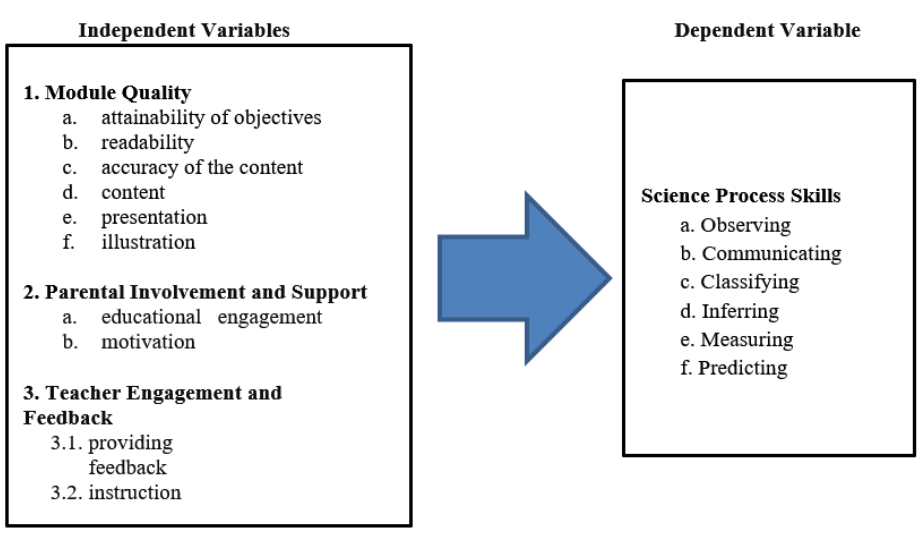

Figure 1. Research Paradigm of the Study

context includes remote areas with limited educational resources and support access.

Research on science process skills has primarily focused on elementary levels (Mutlu, 2020; Wei et al., 2021; Solé-Llussà et al., 2022; Zainil et al., 2023). These studies highlight the importance of early skill development but do not adequately address the challenges faced by secondary-level learners in remote settings.

Studies in various contexts have underscored the critical role of teacher engagement in skill development. However, there is a limited exploration of teacher engagement within pure modular education systems, particularly in regions like Romblon.

Significant gaps remain in understanding how parental educational engagement influences learners' competence at the secondary level. Additionally, the impact of the current health crisis on learners' science process skills is underexplored.

Addressing these knowledge gaps is crucial for developing effective educational strategies and interventions. Understanding the challenges and needs of Grade 7 learners in remote settings can inform institutional plans and programs, help teachers tailor their approaches, and empower parents to provide better support. Ultimately, this research aims to improve science process skills and foster scientific inquiry among learners in a remote learning environment.

Summary of the Review of Related Literature

The literature review focuses on three main areas relevant to the study's objective of determining predictors of science process skills among grade 7 learners in a remote learning setup: the impact of distance education, parental involvement, and teacher engagement.

Impact of Distance Education on Science Process Skills

Research by Smith et al. (2020) highlights the benefits and drawbacks of modular distance education, emphasizing its flexibility and noting the challenges in keeping students engaged in inquiry-based activities. Torres (2024) suggests that designing modular programs to include active participation and practical learning is essential. Brown and Jones (2021) identify the lack of hands-on experiences as a significant hurdle, which can be mitigated by technology-mediated instruction, including virtual labs and simulations (Garcia & Martinez, 2019; Amini et al., 2022). Effective teacher feedback and guidance are critical for student engagement and skill development in remote environments (Johnson & Smith, 2020; Lee & Kim, 2021). Incorporating technology-enhanced learning tools and robust teacher support can help foster science process skills (Van Den Beemt et al., 2023).

Parental Involvement and Support in Science Education

Wilder (2023) underscores the positive correlation between active parental involvement and student achievement in science. This involvement is crucial in remote learning, where it can bridge gaps in student engagement (Gonzalez-DeHass et al., 2020). Effective parental strategies include providing educational resources and engaging in science-related activities (Ata-Aktürk & Demircan, 2021; Darmaji et al., 2022). Parental attitudes significantly impact student interest and achievement in science (Cui et al., 2023; Pelikan et

al., 2021). A meta-analysis by Daucourt et al. (2021) confirms parental involvement's substantial positive effect on student performance across subjects, including science. Collaborative efforts between parents and educators are essential for comprehensive student support in remote learning contexts (Budhrani et al., 2021).

Teacher Engagement and Feedback in Distance Education

Teacher engagement is crucial for student learning outcomes in online courses (Wang et al., 2020). Regular communication, personalized feedback, and interactive discussions enhance student engagement and achievement, especially in science education (Xoliyorova et al., 2024). Timely and constructive feedback plays a significant role in student understanding and motivation (Zhang & Zhao, 2019; Carless, 2022). A meta-analysis by Tao et al. (2022) supports the positive correlation between teacher engagement and student success in distance education. Innovative teaching approaches, such as using online platforms for discussions and virtual labs, are essential for maintaining student interest and developing science process skills (Brown et al., 2021; Putri et al., 2021). Active teacher engagement and feedback are paramount in remote learning, particularly for fostering science process skills among seventh-grade learners (Pramesworo et al., 2023).

This study aimed to determine the predictors of science process skills among grade 7 learners in a remote learning set-up.

Conceptual Framework

The conceptual framework for this study on predictors of science process skills among Grade 7 learners in a remote learning setup focuses on three key components: parental involvement, teacher engagement and feedback, and the impact of distance education modules.

Parental involvement includes the level of engagement, types of support, and attitudes towards science. Teacher engagement and feedback encompass the degree of involvement, quality, and frequency of feedback and instructional strategies in remote learning. These factors are hypothesized to influence the development of science process skills, the dependent variable.

The framework suggests that higher parental involvement, teacher engagement, and quality feedback positively correlate with better science process skills. The study uses quantitative methods, such as surveys and statistical analyses, to explore these relationships and aims to inform educational policies to enhance science learning in remote settings.

METHODOLOGY

Research Design

Using a quantitative research design, this study investigated the impact of DepEd's science self-learning modules, parental support, and teacher engagement on developing science process skills among Grade 7 students in a remote learning setup. Standardized assessments and surveys measured parental involvement, teacher engagement, student engagement, and science process skills, allowing statistical analysis to test hypotheses, identify correlations, and derive generalizable findings.

Techniques like regression analysis and structural equation modeling examined these predictors' direct and indirect effects, providing insights into the mechanisms underlying science education outcomes in remote learning. The study aimed to contribute empirically grounded evidence to the literature on science education and distance learning, informing policies and practices to enhance science process skills among Grade 7 learners.

Population and Samples of the Study

Stratified random sampling determined the number of learner-respondents per school. Using Slovin's formula with a 5% margin of error, 303 Grade 7 learners were selected from Romblon National High School, Macario Molina National High School, and Agnipa National High School.

Research Instrument

The instrument had four parts: Part I evaluated the quality of the science self-learning module; Part II and III assessed perceptions of parental support and teacher engagement; Part IV tested science process skills with a 60-item self-made test covering six skills. A five-point Likert scale measured agreement levels on module quality, parental support, and teacher engagement.

Validity and Reliability of the Instrument

Three education experts reviewed the method with 30 Grade 8 and 20 Grade 9 learners to ensure validity. Cronbach's Alpha analysis showed the following results: science process skills (0.77, acceptable), module quality (0.982, excellent), teacher engagement (0.822, good), mean assessment score of 83.95 out of 100, as indicated in Table 2. High levels of parental support were noted, particularly in "Providing all academic needs" and "Inspiring good grades," which received the highest and parental support (0.877, good).

Table 1. The learners' assessment on the qualities of science self-learning modules.

Qualities of the Modules	Mean	SD	Classification
Attainability of Objectives			
1. The learning materials have learning activities aligned with the most essential competencies.	4.12	0.85	Acceptable
2. The learning materials ensure that learners can acquire the knowledge, skills, and values expected in every lesson.	4.23	0.83	Acceptable
3. It has what learners are required, which is seen as essential, in the teaching-learning process to develop abilities that would prepare students for succeeding lessons and, ultimately, for life-long learning.	4.06	0.95	Acceptable
4. The type of learning materials reflects the type of education provided.	4.06	0.98	Acceptable
5. It provides teaching and learning opportunities that students should master.	4.02	0.98	Acceptable
Total Mean Assessment Score	20.49	3.17	Acceptable
Readability of the Materials			
1. The modules are easy to read and absorb for it is structured in a clear hierarchy of information.	3.85	1.01	Acceptable
2. The font size and style are clear enough to be easily read and understood	4.00	0.88	Acceptable
3. Images and illustrations are clear enough to support the lessons and students' learning.	4.00	0.93	Acceptable
4. Vocabulary level is adapted to target learners' experience and understanding.	3.93	1.01	Acceptable
5. Length of sentences is suited to the comprehension level of the target user.	3.85	1.03	Acceptable
Total Mean Assessment Score	19.63	3.13	Acceptable
Accuracy of the Content			
1. The learning materials contain no errors.	3.73	1.05	Acceptable
2. Lessons and discussions are accurate and precise.	3.93	0.97	Acceptable
3. Answer keys are provided at the end of every learning task.	3.61	1.08	Acceptable
4. It provides factual data on lessons and theories.	4.00	0.96	Acceptable
5. It contains no typographical errors.	3.57	1.13	Acceptable
Total Mean Assessment Score	18.84	3.45	Acceptable
Content Appropriateness			
1. The learning activities can be performed by the learners by considering their characteristics.	4.20	0.95	Acceptable
2. The learning tasks in the self-learning modules are easy to comprehend.	3.84	0.96	Acceptable
3. The learning material promotes ease of understanding of the lesson and instructions in every learning task.	3.94	0.91	Acceptable
4. The learning material uses appropriate language that responds to learners' linguistic backgrounds.	4.00	0.99	Acceptable
5. Content is suitable to the target learner's level of development, needs, and experiences.	4.19	0.92	Acceptable
Total Mean Assessment Score	20.17	3.19	Acceptable
Presentation			
1. The presentation of the lesson is well-organized.	4.29	0.84	Highly Acceptable
2. It considers the learning competencies learners need to master before proceeding with the next lessons/ activities.	4.19	0.88	Acceptable
3. Activities ensure the smooth and gradual development of the learners.	4.00	0.93	Acceptable
4. The learning materials follow and use a specific format.	4.04	0.89	Acceptable
5. Activities are provided before and after the lessons.	4.06	1.02	Acceptable
Total Mean Assessment Score	20.58	3.38	Acceptable
Illustration			
1. The self-learning modules have enough interpretation, or visual explanation of a text, concept, or process.	4.13	0.99	Acceptable
2. Pictures, images, and illustrations are included in the learning materials to help clarify the topics.	4.09	0.89	Acceptable
3. The concepts and theories addressed in the instructional materials are supported with illustrations.	4.08	0.94	Acceptable
4. Images, visual images, and font style and size are clear.	4.14	0.97	Acceptable
5. The modules improve and refine the visual perception of the offered examples.	4.00	1.01	Acceptable
Total Mean Assessment Score	20.44	3.47	Acceptable
Overall Mean Assessment Score	**120.15**	**0.96**	**Acceptable**

Data Gathering Procedures

The study used a descriptive-correlational one-shot survey and linear regression analysis to investigate predictors of science process skills among Grade 7 learners in remote learning. Data were collected via structured surveys from three secondary schools in Romblon District and analyzed through descriptive statistics, correlational analysis, and regression modeling to identify significant predictors of science process skills.

RESULTS AND DISCUSSION

The study aimed to evaluate the quality of DepEd's science self-learning modules and assess the impact of these modules, alongside parental support and teacher engagement, on the development of science process

Table 2. Parents' Level of Support towards Respondents' Capacity to Learn

SUPPORT	Mean	SD	Classification
Educational Engagement			
1. My parents keep an eye on my academic performance.	4.13	0.89	Supportive
2. My parents constantly encourage me to do well or excel in school.	4.03	0.93	Supportive
3. My parents provide all my academic needs.	4.20	0.96	Supportive
4. My parents allocate sufficient time with me to assist my studies.	3.82	1.06	Supportive
5. My parents support me financially, emotionally, and morally.	4.11	1.10	Supportive
6. My parents ensure I can acquire the knowledge, skills and values taught in school.	3.97	1.01	Supportive
7. My parents ensure I can understand the lessons well.	3.91	1.11	Supportive
8. My parents ensure that I am doing my school tasks and activities.	4.06	1.03	Supportive
9. My parents participate in all parent-teacher conferences and meetings.	4.04	1.10	Supportive
10. My parents talk with me if I am getting poor grades in school.	3.85	1.21	Supportive
11. My parents ask my teachers how I am doing in school.	3.75	1.20	Supportive
Total Mean Assessment Score	43.87	6.37	
Motivation			
1. My parents inspire me to get good grades.	4.32	0.93	Supportive
2. My parents motivate me to do well in school.	4.07	1.06	Supportive
3. My parents motivate me to give my all-out performance in school.	3.98	0.97	Supportive
4. My parents tell me to do well in any extracurricular activities.	3.91	1.07	Supportive
5. My parents motivate me to perform well in various learning tasks.	3.97	1.07	Supportive
6. My parents support me in every school activity.	4.07	1.12	Supportive
7. My parents sufficiently reward me for my school achievements.	3.88	1.08	Supportive
8. My parents help and support me in my academic tasks.	4.08	1.01	Supportive
9. My parents share in every success I have.	3.87	1.08	Supportive
10. My parents cheer me up when I am struggling nwith school activities.	3.92	1.13	Supportive
Total Mean Assessment Score	40.08	6.42	
Overall Mean Assessment Score	**83.95**	**11.89**	

Table 3. The teachers' level of engagement in assisting the learners in their modular learning

Statements	Mean	SD	Classification
Providing Feedback			
1. The teachers provide timely feedback.	4.08	0.94	Engaged
2. The teachers set criteria for assessment/ judging clearly in advance.	4.02	0.99	Engaged
3. The teachers' marking has been fair and reasonable.	3.90	1.04	Engaged
4.I receive detailed comments, both written and oral, on my work.	3.89	1.07	Engaged
5. The teachers clarify things whenever I have questions.	4.10	1.02	Engaged
Total Mean Assessment Score	19.99	3.17	
Instruction			
1. The teachers are good at explaining things whenever I communicate with them.	4.28	1.01	Engaged
2. The teachers master the lessons well whenever I ask them about concepts that are vague to me.	4.07	0.94	Engaged
3. The teachers make the lessons interesting by providing different learning activities.	4.22	0.93	Engaged
4. The teachers use appropriate techniques to simplify the lessons.	4.05	1.03	Engaged
5. The teachers provide different learning activities manifested in the self-learning modules.	4.08	1.05	Engaged
Total Mean Assessment Score	20.71	3.36	
Overall Mean Assessment Score	**40.70**	**5.80**	

skills among Grade 7 learners in a remote learning setup. Learners assessed the modules on several criteria, including attainability of objectives, readability, accuracy, appropriateness, presentation, and illustration (Table 1). The regression analysis, as shown in Table 5, revealed that "Attainability of Objectives" and "Presentation" significantly and positively influenced science process skills, while "Content Appropriateness" and "Accuracy" did not. This finding suggests that clear objectives and well-presented content are crucial for effective learning.

Parental support was evaluated regarding educational engagement and motivation, with an overall mean assessment score of 83.95 out of 100, as indicated in Table 2. High levels of parental support were noted, particularly in "Providing all academic needs" and "Inspiring good grades," which received the highest scores. Significant positive correlations between parental support and learners' science process skills underscore the importance of parental involvement in academic success.

Teacher engagement was also positively perceived, particularly in providing feedback and instruction. Table 3 shows that the overall mean assessment score of teacher engagement was 40.70 out of 50, or 81.4%. While learners appreciated teachers'

Table 4. The learners' level of science process skills

SKILLS	M	SD	Classification
Observing	4.19	1.92	Below Average
Communicating	1.39	2.13	Poor
Classifying	4.55	2.30	Average
Predicting	4.29	2.73	Below Average
Measuring	3.80	2.38	Below Average
Inferring	4.28	2.55	Below Average
Overall Mean Score	**22.52**	**8.79**	

Table 5. The correlation between science process skills and module quality, parents' support, and teachers' level of engagement

Independent Variable	rho	p-value
Module Quality		
Attainability of Objectives	0.177**	0.002
Readability of the Materials	0.140**	0.015
Accuracy of the Content	0.015	0.797
Content Appropriateness	0.027	0.642
Presentation	0.198**	0.001
Illustration	0.132**	0.022
Parents' Support		
Educational Engagement	0.224**	0.001
Motivation	0.168**	0.002
Teachers' Level of Engagement		
Providing Feedback	0.189**	0.001
Instruction	0.179**	0.002

Table 6. Analysis of variance of module quality on science process skills

Source	Sum of Squares	*df*	Mean Square	F	p-value
Regression	2053.984	6	342.331	4.764	<.001
Residual	21271.580	296	71.863		
Total	23325.564	302			

availability for clarification and good explanations, areas like detailed feedback and appropriate techniques scored lower. Significant positive correlations were found between teacher engagement and science process skills, highlighting the importance of active teacher involvement.

Learners demonstrated varying proficiency levels across different science process skills, as shown in Table 4. The overall proficiency level remained below 75%, with learners achieving a mean score of 22.52 out of 60, or 37.5%. "Classifying" scored highest, indicating a moderate ability, while "Communicating" and "Measuring" were identified as weaker areas. This underscores the need to enhance communication and measurement skills to improve scientific proficiency.

Significant positive correlations were found between learners' science process skills and module qualities, parental support, and teacher engagement, as seen in Table 5. Key factors such as clear objectives, well-presented materials, educational engagement, and constructive feedback were strongly linked to better science process skills. Regression analysis identified significant predictors of science process skills, as shown in Table 6. "Attainability of Objectives" and "Presentation" in modules, parental educational engagement, and teacher feedback were significant predictors. This highlights the importance of well-structured modules and active support from parents and teachers.

Based on the findings, a multifaceted intervention program is proposed. This program should integrate improved module design, enhanced parental support, and increased teacher engagement. By addressing these factors, educators can create a supportive learning environment that fosters the development of science process skills, enhancing scientific inquiry and overall academic achievement. The study emphasizes the need for comprehensive strategies involving well-designed educational materials, active parental involvement, and robust teacher engagement to improve science process skills among Grade 7 learners in a remote learning setup.

CONCLUSION

The study found that the quality of DepEd's science self-learning modules, parental support, and teacher engagement significantly influence the development of science process skills among Grade 7 learners in a remote learning setup. Clear objectives and well-presented content in the modules were crucial for effective learning. High parental support and active teacher engagement, particularly in providing feedback, were strongly correlated with better science process skills. A comprehensive approach is needed to improve these skills, including better-designed modules, enhanced parental involvement, and increased teacher engagement. This holistic strategy can create a supportive learning environment that fosters scientific inquiry and academic achievement among learners.

AUTHORS' CONTRIBUTIONS

RM conceived and designed the study, collected and analyzed the data, interpreted the results, and drafted the manuscript. BS served as the adviser of the lead author.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

Aldhafeeri, F. M., & Alotaibi, A. A. (2022). Effectiveness of digital education shifting model

on high school students' engagement. *Education and Information Technologies, 27*(5), 6869-6891. https://doi.org/10.1007/s10639-021-10879-4

Amini, M., Ravindran, L., & Lee, K. F. (2022). A review of the challenges and merits of collaborative learning in online translation classes. *Journal of Research, Policy & Practice of Teachers and Teacher Education, 12*(1), 69–79. https://ojs.upsi.edu.my/index.php/JRPPTTE/article/view/5635

Ata-Aktürk, A., & Demircan, H. Ö. (2021). Supporting preschool children's STEM learning with parent-involved early engineering education. *Early Childhood Education Journal, 49*(4), 607–621. https://doi.org/10.1007/s10643-020-01100-1

Brown, C. D., & Jones, E. F. (2021). Challenges and opportunities of remote learning environments for science education. International *Journal of Science Education, 43*(3), 451–468. https://doi.org/10.1080/09500693.2020.1841299

Budhrani, K., Martin, F., Malabanan, O., & Espiritu, J. L. (2021). How did parents balance it all? Work-from-home parents' engagement in academic and support roles during remote learning. *Journal of Online Learning Research, 7*(2), 153–184. https://www.learntechlib.org/p/218909/

Carless, D. (2022). From teacher transmission of information to student feedback literacy: Activating the learner role in feedback processes. *Active Learning in Higher Education, 23*(2), 143–153. https://doi.org/10.1177/1469787420945845

Cui, Y., Zhang, D., & Leung, F. K. (2023). The influence of parental educational involvement in early childhood on 4th grade students' mathematics achievement. In *Developing Culturally and Developmentally Appropriate Early STEM Learning Experiences* (pp. 113–133). Routledge. https://doi.org/10.4324/9781032634197-8

Darmaji, D., Kurniawan, D. A., Astalini, A., & Rini, E. F. S. (2022). Science processing skill and critical thinking: reviewed based on the gender. *JPI (Jurnal Pendidikan Indonesia), 11*(1), 133–141. https://doi.org/10.23887/jpiundiksha.v11i1.35116

Department of Education [DepEd]. (2020). SDO Romblon Performance in the NAT G-10 SY 2019-2020. Schools Division Office of Romblon.

Department of Education [DepEd]. (2023). SDO Romblon Performance in the NAT G-10 SY 2022-2023. Schools Division Office of Romblon.

Dolbin-MacNab, M. L., Jeanblanc, A. B., Musil, C. M., Infurna, F. J., & Smith, G. C. (2023). Supporting grandchildren's remote instruction during COVID-19: Experiences of custodial grandmothers. *Psychology in the Schools, 60*(5), 1560–1580. https://doi.org/10.1002/pits.22714

Garcia, M. J., & Martinez, R. S. (2019). Adaptation of pedagogical strategies for distance science education. *Distance Education, 40*(3), 339–356. https://doi.org/10.1080/01587919.2019.1638999

Gonzalez-DeHass, A. R., Willems, P. P., Powers, J. R., & Musgrove, A. T. (2022). Parental involvement in supporting students' digital learning. *Educational Psychologist, 57*(4), 281–294. https://doi.org/10.1080/00461520.2022.2129647

Johnson, L. K., & Smith, D. W. (2020). Teacher support in enhancing science process skills in distance education contexts. *Educational Technology Research and Development, 68*(4), 2057–2076. https://doi.org/10.1007/s11423-020-09885-1

Lee, H. J., & Kim, S. Y. (2021). Student perceptions of distance science learning and its impact on science process skills development. *Journal of Research in Science Teaching, 58*(8), 1017–1039. https://doi.org/10.1002/tea.21791

Mutlu, A. (2020). Evaluation of students' scientific process skills through reflective worksheets in the inquiry-based learning environments. *Reflective Practice, 21*(2), 271–286. https://doi.org/10.1080/14623943.2020.1736999

Smith, A. B., et al. (2020). The role of modular distance education in promoting science process skills among middle school students. *Journal of Science Education and Technology, 29*(5), 658–672. https://doi.org/10.1007/s10956-020-09860-1

Solé-Llussà, A., Aguilar, D., & Ibáñez, M. (2022). Video-worked examples to support the development of elementary students' science process skills: A case study in an inquiry activity on electrical circuits. *Research in Science & Technological Education, 40*(2), 251–271. https://doi.org/10.1080/02635143.2020.1786361

Torres, K. M. (2024). Transforming higher education with microlessons. In *Global Perspectives on Micro-Learning and Micro-Credentials in Higher Education* (pp. 59–74). IGI Global. https://doi.org/10.4018/978-1-7998-9187-1.ch004

Van den Beemt, A., Groothuijsen, S., Ozkan, L., & Hendrix, W. (2023). Remote labs in higher engineering education: Engaging students with active learning pedagogy. *Journal of Computing in Higher Education, 35*(2), 320–340. https://doi.org/10.1007/s12528-022-09331-4

Wang, J., Wang, Y., & Zhu, L. (2020). The role of teacher engagement in promoting student learning outcomes in online courses. *Internet and Higher Education, 44*, 1–10. https://doi.org/10.1016/j.iheduc.2019.100718

Wilder, S. (2023). Effects of parental involvement on academic achievement: A meta-synthesis. In *Mapping the Field* (pp. 137–157). Routledge. https://doi.org/10.4324/9781003403722-12

Zhang, L., & Zhao, X. (2019). The impact of teacher feedback on student learning in online learning environments. *Computers & Education, 137*, 1–12. https://doi.org/10.1016/j.compedu.2019.03.011