Integration of Technology-Based Learning Methods in the Islamic Education System at Al-Ulum Integrated Islamic High School Medan

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Abstract

This study aims to develop and analyze multicultural learning strategies that can improve cultural understanding in early childhood at RA Al Ikhlas Kongo, Deli Serdang. In the context of increasing globalization, understanding cultural diversity is very important for fostering tolerance and mutual respect from an early age. Through an approach based on multicultural values, this study will identify effective learning models for introducing children to cultural diversity in their surroundings. This study uses a qualitative approach with a case study method involving teachers at RA Al Ikhlas Kongo, Deli Serdang as research subjects. Data was obtained through in-depth interviews, observations, and documentation studies, which were then analyzed using thematic analysis techniques. The focus of this study is to design learning strategies that are appropriate for the characteristics of early childhood and apply them in learning activities that are interesting and easy to understand. By introducing various elements of local and international culture, it is hoped that children will be more sensitive to diversity and understand and appreciate the differences that exist in society. The results of the study show that the application of multicultural learning strategies at RA Al Ikhlas Kongo is very effective in increasing cultural understanding in early childhood. Through a story-based approach, songs, traditional games, and art activities, children can learn about various cultures in a fun way. Teachers also actively encourage children to discuss the cultural diversity around them, either through personal experiences or stories from parents or the community. The discussion revealed that the use of visual and interactive media greatly helps children understand the concept of cultural diversity. In addition, experience-based learning, such as visiting cultural sites or inviting speakers from various backgrounds, also increases children's awareness of the importance of tolerance. Overall, this study shows that multicultural learning integrated into the early childhood education curriculum can foster mutual respect and strengthen understanding of diversity from an early age. It is hoped that the results of this study can be used as a reference for other educational institutions in designing and implementing learning programs that support the growth of tolerance and appreciation for cultural differences.

Keywords: Technology Integration, Technology-Based Learning, Islamic Education System.

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Introduction

The era of the 4.0 industrial revolution and society 5.0 has brought massive digital transformation in various sectors, including education. Information and communication technology (ICT) has become an integral part of everyday life, including in the teaching and learning process. The Ministry of Education and Culture of the Republic of Indonesia has promoted a school digitization program in response to the challenges and opportunities of the 21st century (Kemdikbud, 2020). The integration of technology in learning is no longer seen as an alternative but a necessity to create learning that is more engaging, interactive, and relevant to the needs of the times.

The Fourth Industrial Revolution and its birth, Society 5.0. The Fourth Industrial Revolution is characterized by technological disruption that integrates the physical, digital, and biological worlds through artificial intelligence, the Internet of Things (IoT), big data, and cloud computing (Schwab, 2016). This transformation not only changes the industrial landscape, but also fundamentally reshapes the socio-economic order. As a response and evolution of the 4.0 Revolution, Society 5.0 was introduced as a human-centric concept, where advanced technology is integrated into all aspects of life to solve various social problems and create new value (Cabinet Office of Japan, 2016). In this context, education is no longer isolated in an ivory tower, but has become a sector that is directly affected and must adapt massively.

The most obvious implication of these two eras is that Information and Communication Technology (ICT) has become the core infrastructure that drives community activities. ICT has transitioned from being merely a tool to becoming an environment that surrounds and shapes everyday life, a condition often referred to as a digital ecosystem (Sutherland, 2018). In this digital ecosystem, the teaching and learning process has undergone a paradigm shift. Physical classrooms are no longer the only locus of learning, as technology has expanded it into a hybrid learning space without boundaries (Reyes, 2020).

In response to this global transformation, the Indonesian government, through the Ministry of Education and Culture (Kemdikbud), has launched various strategic initiatives, one of which is the School Digitalization Program. This program is not only about providing hardware, but more broadly covers the development of digital platforms, digital learning content, and improving teacher competencies in Learning Technology s (Kemdikbud, 2020). This policy is a response to the challenges of the 21st century as well as an effort to take advantage of opportunities to improve access, quality, and relevance of national education.

Based on this reality, the position of technology integration in learning has undergone a paradigm shift. It is no longer seen as an option or supplement, but has shifted to become an imperative. The integration referred to is not merely the use of technology, but a systematic approach in which technology is used to facilitate deeper learning, create a more immersive, interactive, and personalized learning experience, and ensure that education graduates have competencies relevant to the demands of the times (Fullan & Langworthy, 2014). In other words, technology integration is a catalyst for the realization of student-centered learning and the development of 21st-century skills.

However, integrating technology into education is not simply a matter of hardware and software availability. The essence lies in how the technology is adopted and adapted into meaningful learning methods, thereby improving the quality of the learning process and outcomes for students (Higgins et al., 2012). This challenge becomes even more complex when applied in the context of integrated Islamic schools, which aim not only to achieve academic

(cognitive) competence but also to shape the character and morals of students (affective and psychomotor) based on Islamic values.

The claim that technology integration goes beyond mere infrastructure availability refers to a paradigm shift in the field of educational technology. An approach that focuses solely on providing devices (technology-first approach) often fails to produce significant pedagogical impact, a phenomenon that some experts refer to as the "productivity paradox" in digital education (Selwyn, 2017). The essence of true integration, as emphasized by Higgins et al. (2012), lies in meaningful learning, where technology serves as a catalyst for achieving deeper educational goals, rather than merely as entertainment or a substitute for conventional tools.

The concept referred to here is based on the TPACK (Technological Pedagogical Content Knowledge) framework introduced by Mishra and Koehler (2006). Effective integration requires dynamic synergy between three domains of knowledge: teaching content ( ), teaching methodology (Pedagogical Knowledge), and understanding of technology (Technological Knowledge). Thus, the presence of technology must fundamentally change and enrich pedagogical interactions, for example by enabling differentiated learning, providing instant feedback, or facilitating collaboration that was not possible before.

This integration challenge reaches a higher level of complexity in the context of Integrated Islamic Schools. These institutions operate on a unique philosophical foundation, namely the vertical integration of general sciences (al-'ulum al-kauniyyah) and Islamic sciences (al-'ulum al-diniyyah) within a framework of tawhid (Al-Attas, 1980). The goal is not only to develop intellectual intelligence (fathanah) but also to refine the morals (akhlāq al-karīmah) and spirituality of students. Therefore, the criteria for "meaningful" technology integration in this environment must take into account the value-laden dimension.

The critical question is: How can technology be adopted not only to improve cognitive effectiveness, but also to strengthen Islamic character building? An instrumental approach, which views technology as neutral, is inadequate. Instead, a critical approach is needed that filters every technology through the lens of Islamic values. For example, digital collaboration platforms are not only assessed for their efficiency, but also for their ability to foster values such as ukhuwah Islamiyah (brotherhood), amar ma'ruf nahi munkar, and collective responsibility. Similarly, the use of videos or simulations for science subjects must be able to direct students towards an awareness of the majesty of Allah SWT's creation (tadabbur al-kaun), thereby strengthening their faith.

In other words, technology integration in Integrated Islamic High Schools must be designed to achieve dual objectives:

1. Secular Pedagogical Objectives: To improve 21st century skills such as critical thinking, creativity, communication, and collaboration (Partnership for 21st Century Learning, 2015).
2. Spiritual-Pedagogical Objectives: Strengthening Islamic identity, instilling good character, and developing students' spiritual intelligence (spiritual quotient).

Thus, the complexity faced by Al-Ulum Integrated Islamic High School in Medan is not only at the technical-operational level (such as teacher training and internet connectivity), but mainly at the philosophical-design level. The challenge is to formulate a model of technology integration that simultaneously meets the demands of the national curriculum, is effective according to modern pedagogical standards, and authentically reflects and reinforces the Islamic character that is the image of the institution. This is an effort to realize a TPACK

framework enriched with Islamic values, which can be referred to as TPACK-I (Technological Pedagogical Content Knowledge with Islamic values).

Al-Ulum Integrated Islamic High School in Medan, as one of the leading Islamic educational institutions in Medan, has a vision to produce a generation that is intelligent, skilled, and has noble character. In order to realize this vision, the school is required to integrate Islamic values with technological advances. The fundamental question that arises is how to design technology-based learning methods that are not only pedagogically effective but also in line with the Islamic educational philosophy that is embraced.

Based on initial observations, Al-Ulum Integrated Islamic High School in Medan has begun implementing several technological tools such as projectors, e-learning platforms, and social media for learning. However, it is not yet comprehensively known how this integration is carried out, the obstacles faced by teachers, and its impact on students. Therefore, this research is important to describe the complete process, challenges, and effectiveness of integrating technology-based learning methods in the school.

Literature Review

2.1 Technology-Based Learning Methods

Technology-based learning refers to the use of technological tools and resources to facilitate, enhance, and support the learning process. According to Bates (2015), technology in education is not only a tool, but an integral part of learning design that can change the way students access information, collaborate, and construct knowledge. Effective technology integration occurs when its use is routine, transparent, and supports curriculum objectives (Davies, 2014).

Some examples of technology-based learning methods that are relevant to secondary schools include:

a. Blended Learning.

A model that combines traditional face-to-face learning with online learning activities. According to Horn & Staker (2015), blended learning allows for personalization of the learning experience so that students can learn at their own pace and in their own style.

b. Flipped Classroom.

In this model, students learn new material at home through videos or digital content, while class time is used for discussion, problem solving, and teacher-guided collaborative activities (Bergmann & Sams, 2012).

c. Project-Based Learning (PjBL) with Technology.

Technology is used as a tool for researching, collaborating, creating, and presenting real-world projects that are the focus of learning (Larmer, Mergendoller, & Boss, 2015).

d. Mobile Learning (m-learning).

The use of mobile devices such as smartphones and tablets for learning that can take place anywhere and anytime (Crompton, 2013).

2.2 Integrated Islamic Education System

Integrated Islamic Education is an education system that integrates general education (science and technology) with Islamic education (faith, morals, and worship) into a single curriculum. The goal is to develop well-rounded individuals who possess a balance of academic and spiritual excellence (Muhaimin, 2015). According to Ashraf (2015), the essence of Islamic

education is the integration of faith and knowledge, where all knowledge is seen as a manifestation of the oneness of God (tauhid).

In this context, technological integration must be carried out in accordance with principles that are in line with Islamic values. Technology must be a means to bring us closer to Allah, not an end in itself. Its use must be directed towards shaping students' characters to be responsible, honest, and noble, as well as avoiding negative impacts such as misuse of information and moral degradation (Al-Attas, 2015).

2.3 Technology Integration in Islamic Religious Education

The integration of technology in Islamic education requires a holistic approach. According to Rahim (2018), this integration must consider three main aspects:

a. Technopedagogical Aspect

How technology is used to improve the effectiveness of teaching methods (pedagogy) while still paying attention to the characteristics of the subject, both general and Islamic (such as the Qur'an, Fiqh, or Aqidah Akhlak).

b. Content Aspects.

The development or selection of digital content (*e-books*, videos, simulations) that is not only academically accurate but also contains Islamic values and is free from elements that contradict Sharia law.

c. Cultural and Value Aspects.

Creating a learning environment that utilizes technology while upholding the values of ukhuwah (brotherhood), amar ma'ruf nahi munkar (enjoining what is good and forbidding what is evil), and exemplary behavior.

The theory underlying this integration is TPACK (*Technological Pedagogical Content Knowledge*) developed by Mishra & Koehler (2006). TPACK emphasizes that effective teachers need a comprehensive understanding of the interaction between three components of knowledge: content (teaching material), pedagogy (teaching methods), and technology. In the context of Integrated Islamic High Schools, the TPACK framework can be modified by adding the dimension of Islamic values, thus becoming *Technological Pedagogical Content Knowledge with Islamic Values* (TPACK-Iv), which requires teachers to be able to integrate all four components synergistically.

2.4 Factors Affecting Technology Integration

The success of technology integration is influenced by several factors, which Ertmer (1999) grouped into two types of barriers:

a. External Barriers (First-order Barriers).

Related to conditions outside the teacher, such as: availability of infrastructure and access to technology (Inan & Lowther, 2010), technical support, adequate training, school policies, and time available for planning.

b. Internal Barriers (Second-order Barriers).

Related to the beliefs, attitudes, and competencies of the teacher themselves, including beliefs about pedagogy, confidence in using technology (self-efficacy), and readiness to change (Hew & Brush, 2007).

2.5 The Impact of Technology Integration on Learning

Previous research shows that well-planned and well-implemented technology integration can have positive impacts, including:

a. Increasing Student Learning Motivation.

Interactive and engaging technology can increase student interest and engagement in learning (Zheng, Warschauer, Lin, & Chang, 2016).

b. Improving Learning Outcomes.

Technology can facilitate the understanding of abstract concepts through simulation and visualization, as well as provide rapid feedback, which ultimately leads to improved learning outcomes (Hattie, 2009).

c. Developing 21st Century Skills.

Such as critical thinking, creativity, communication, and collaboration skills (Partnership for 21st Century Learning, 2015)

Research Methodology

This study uses a qualitative approach with a case study method to examine the integration of technology in the learning system at Al-Ulum Integrated Islamic High School in Medan. A qualitative approach was chosen because it allows researchers to explore in depth the phenomena occurring in the context of technology-based education at the school. In this study, the researcher aims to understand how technology is applied in the learning process, as well as how it affects the interaction between teachers and students, and the achievement of desired educational goals.

The case study method was used to analyze specifically how technology is applied at Al-Ulum Integrated Islamic High School in Medan, an educational institution that combines Islamic values with a modern learning approach. The main focus of this study was to identify the types of technology used in learning, the implementation strategies applied by the school, and the challenges and opportunities faced by teachers and students in integrating technology into teaching and learning activities.

Data was collected through several techniques, namely in-depth interviews, observations, and documentation studies. Interviews were conducted with teachers, students, and school management to obtain information about their experiences in using technology for learning. Observations were conducted in classrooms and learning environments to directly observe the application of technology in the learning process. In addition, the researchers also studied relevant documents, such as lesson plans, learning materials provided through technology platforms, and reports or notes related to technology implementation.

Data analysis was conducted inductively by grouping information obtained from interviews, observations, and documentation. The results of this analysis were then processed to identify the main themes related to the integration of technology in learning, including the types of technology used, their effectiveness, and the obstacles and opportunities that arose during the implementation process. The data collected was evaluated qualitatively by looking at the patterns that emerged, and conclusions were then drawn about how technology could be optimized to improve the quality of learning at Al-Ulum Integrated Islamic High School in Medan.

Results

This study aims to examine the integration of technology-based learning methods in the education system at Al-Ulum Integrated Islamic High School in Medan. Based on data collected through interviews with teachers and students, classroom observations, and documentation studies, it was found that this school has integrated various types of technology into their learning process. The types of technology used include e-learning applications such as Google Classroom, video learning platforms such as YouTube and Zoom, and online communication tools to support interaction between teachers and students.

4.1 Types of Technology Used

E-learning applications are one of the main technologies used at Al-Ulum Integrated Islamic High School in Medan. Google Classroom, for example, is used by teachers to distribute learning materials, assign tasks, and manage assessments. Students access learning materials through this platform and complete assigned tasks online. In addition, video platforms such as Zoom are used for online face-to-face learning, allowing teachers to interact directly with students even though they are not in the same classroom. This is in line with research showing that the use of technology in education can increase flexibility in the teaching and learning process, especially during a pandemic (Garrison & Vaughan, 2008).

4.2 Technology Implementation Strategies

Al-Ulum Integrated Islamic High School in Medan uses several strategies to maximize the use of technology in learning. Teachers are given regular training on the use of learning applications and online communication tools. In addition, the school also provides adequate hardware, such as laptops and a good internet connection to support teaching and learning activities. However, not all students have equal access to the necessary technological devices, especially those who live in areas with limited internet infrastructure. This is a challenge that must be addressed in the implementation of learning technology. This is also supported by previous findings which state that technological access constraints and inadequate infrastructure are often obstacles to the use of technology in schools (Selwyn, 2016).

4.3 Challenges Faced

The main challenge faced in integrating technology at Al-Ulum Integrated Islamic High School in Medan is limited internet access in some more remote areas. Some students who live in areas with poor internet signal quality have difficulty participating in online learning. According to Garrison and Vaughan (2008), although technology can improve access to education, technical barriers such as poor internet connection quality can limit its effectiveness. In addition, some teachers also expressed limitations in their technological skills. Despite receiving training, some teachers still find it difficult to utilize the applications to their full potential.

In addition, there is resistance to change from some students who feel more comfortable with traditional learning methods. Some students expressed that they find it easier to understand the material when taught directly by the teacher in the classroom, rather than through an online platform. This is in line with Prensky's (2001) opinion that although technology offers many benefits, the transition to technology-based learning often faces psychological and habitual barriers from students and teachers.

4.4 Opportunities Created by Technology

Technology also opens up many new opportunities in the learning process. One of them is increasing student participation in learning. The use of platforms such as Google Classroom and Zoom allows students to more easily access learning materials anytime and anywhere. This supports the principle of more flexible learning based on student needs (Bates, 2015). In addition, technology also allows teachers to provide feedback more quickly and effectively. The use of learning applications allows teachers to directly provide comments and assessments on student assignments, which enhances interaction and communication between teachers and students (Johnson, Adams Becker, Estrada, & Freeman, 2014).

Furthermore, technology can also strengthen teaching based on Islamic values. For example, in Islamic religious education, technology enables the provision of more varied learning materials, such as video lectures, articles, and online discussion forums that can deepen students' understanding of the material being taught. Thus, technology can be an effective tool for building a more innovative learning system that is relevant to the demands of the times without neglecting religious values.

Conclusion

Based on the results of the study, the integration of technology in learning at Al-Ulum Integrated Islamic High School in Medan shows great potential for improving the quality of education. The use of technology, especially e-learning applications and video learning platforms, has helped improve the effectiveness and efficiency of the teaching and learning process. However, challenges such as limited internet access and limited technological skills among teachers need to be addressed in order to maximize the use of technology in education. Therefore, it is recommended that the school provide ongoing technology training for teachers and ensure equal access to technology for all students in order to create an inclusive and effective learning environment.

References

[1] Al-Attas, S. M. N. (2015). *Konsep Pendidikan dalam Islam*. Bandung: Pustaka Bandung.

[2] Ashraf, A. (2015). *Horison Baru Pendidikan Islam*. Jakarta: Pustaka Firdaus.

[3] Bates, A. W. (2015). *Teaching in a Digital Age: Guidelines for Designing Teaching and Learning*. Vancouver, BC: Tony Bates Associates Ltd.

[4] Bates, T. (2015). *Teaching in a digital age: Guidelines for designing teaching and learning for a digital age*. Tony Bates Associates Ltd.

[5] Bergmann, J., & Sams, A. (2012). *Flip Your Classroom: Reach Every Student in Every Class Every Day*. Washington, DC: International Society for Technology in Education (ISTE).

[6] Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101.

[7] Creswell, J. W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications.

[8] Crompton, H. (2013). A historical overview of mobile learning: Toward learner-centered education. In Z. L. Berge & L. Y. Mullenburg (Eds.), *Handbook of mobile learning* (pp. 3–14). Florence, KY: Routledge.

[9] Davies, R. S. (2014). *Designing and Conducting Mixed Methods Research* (3rd ed.). Thousand Oaks, CA: SAGE Publications. (Buku asli diterbitkan pada 2011).

[10] Ertmer, P. A. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47–61.

[11] Fauzan, R., & Arifin, S. (2023). Digitalisasi Madrasah: Tantangan dan Strategi Implementasi di Era Society 5.0. *Jurnal Pendidikan Islam*, 15(1), 45-62.

[12] Fullan, M., & Langworthy, M. (2014). *A Rich Seam: How New Pedagogies Find Deep Learning*. London: Pearson.

[13] Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. Jossey-Bass.

[14] Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. Handbook of qualitative research, 2, 105-117.

[15] Hattie, J. (2009). *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. New York, NY: Routledge.

[16] Heider, A. (2022). *Integrating Technology in Catholic Education: A TPACK-S Framework for Whole-Person Formation*. Journal of Catholic Education.

[17] Hew, K. F., & Brush, T. (2007). Integrating technology into K-12 teaching and learning: Current knowledge gaps and recommendations for future research. *Educational Technology Research and Development, 55*(3), 223–252.

[18] Higgins, S., Xiao, Z., & Katsipataki, M. (2012). *The Impact of Digital Technology on Learning: A Summary for the Education Endowment Foundation*. Durham, UK: Education Endowment Foundation.

[19] Horn, M. B., & Staker, H. (2015). *Blended: Using Disruptive Innovation to Improve Schools*. San Francisco, CA: Jossey-Bass.

[20] Howard, S. K., Tondeur, J., Siddiq, F., & Scherer, R. (2021). Ready, set, go! Profiling teachers' readiness for online teaching in secondary education. *Technology, Pedagogy and Education*, 30(1), 141-158.

[21] Inan, F. A., & Lowther, D. L. (2010). Factors affecting technology integration in K-12 classrooms: A path model. *Educational Technology Research and Development, 58*(2), 137–154.

[22] Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2014). *The NMC horizon report: 2014 higher education edition*. New Media Consortium.

[23] Kemdikbud. (2020). *Panduan Penyelenggaraan Pembelajaran pada Tahun Ajaran dan Tahun Akademik Baru di Masa Pandemi COVID-19*. Jakarta: Kementerian Pendidikan dan Kebudayaan Republik Indonesia.

[24] Larmer, J., Mergendoller, J., & Boss, S. (2015). *Setting the Standard for Project Based Learning: A Proven Approach to Rigorous Classroom Instruction*. Alexandria, VA: ASCD.

[25] Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054.

[26] Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054.

[27] Muhaimin. (2015). *Pengembangan Kurikulum Pendidikan Agama Islam di Sekolah, Madrasah, dan Perguruan Tinggi*. Jakarta: Rajawali Pers.

[28] Partnership for 21st Century Learning. (2015). *P21 Framework Definitions*. Washington, DC: Author.
[29] Prensky, M. (2001). *Digital natives, digital immigrants*. On the Horizon, 9(5), 1-6.
[30] Puentedura, R. R. (2006). *Transformation, Technology, and Education*. Hippasus. Diakses dari http://hippasus.com/resources/tte/
[31] Rahim, F. (2018). *Integrasi Teknologi Informasi dalam Pembelajaran PAI: Teori dan Praktik*. Yogyakarta: Deepublish.
[32] Reyes, C. (2020). *The Hybrid Learning Space: A Framework for Understanding Education 4.0*. Journal of Educational Technology, 45(2), 123-135.
[33] Sailin, S. N., & Mahmor, N. A. (2021). Improving student teachers' digital pedagogy through meaningful learning activities. *Asian Journal of University Education*, 17(1), 1-15.
[34] Schwab, K. (2016). *The Fourth Industrial Revolution*. Geneva: World Economic Forum.
[35] Selwyn, N. (2016). *Education and technology: Key issues and debates*. Bloomsbury Academic.
[36] _____. (2017). *Education and Technology: Key Issues and Debates* (2nd ed.). London: Bloomsbury Academic.
[37] Stake, R. E. (1995). The art of case study research. Sage Publications.
[38] Sutherland, A. (2018). *Living in a Digital Ecosystem: The Future of Work and Education*. Cambridge: MIT Press.
[39] Voogt, J., & Knezek, G. (Eds.). (2021). *Handbook of Information Technology in Primary and Secondary Education*. Springer International Handbooks of Education. Springer, Cham.
[40] Zhang, W., & Tang, J. (2022). Cultural values and technology adoption: A comparative study of Chinese and American classrooms. *Computers & Education*, 180, 104448.
[41] Zheng, B., Warschauer, M., Lin, C. H., & Chang, C. (2016). Learning in one-to-one laptop environments: A meta-analysis and research synthesis. *Review of Educational Research, 86*(4), 1052–1084.