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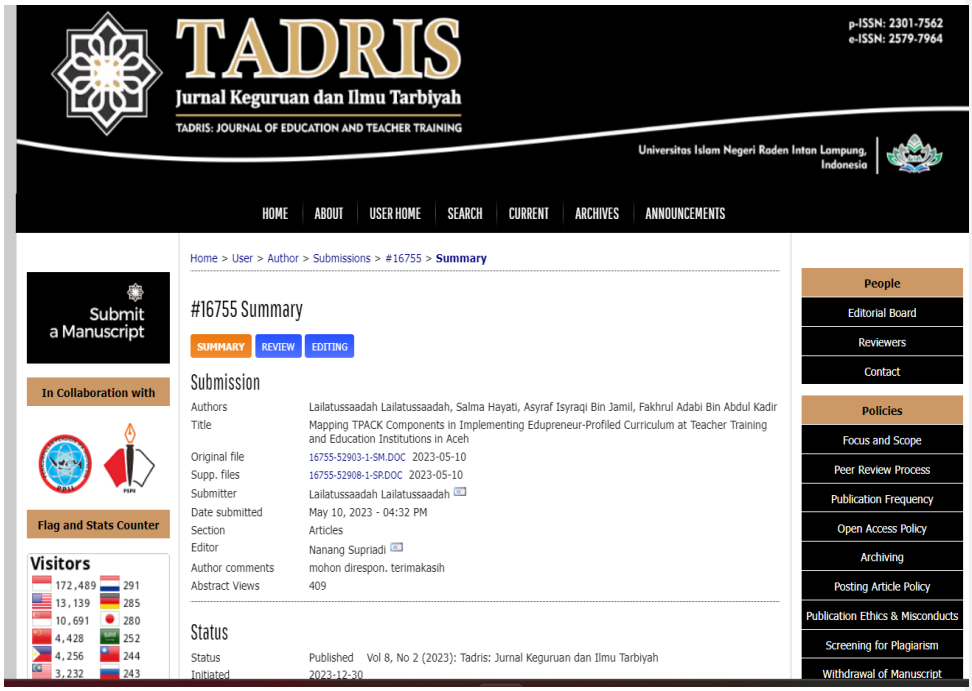

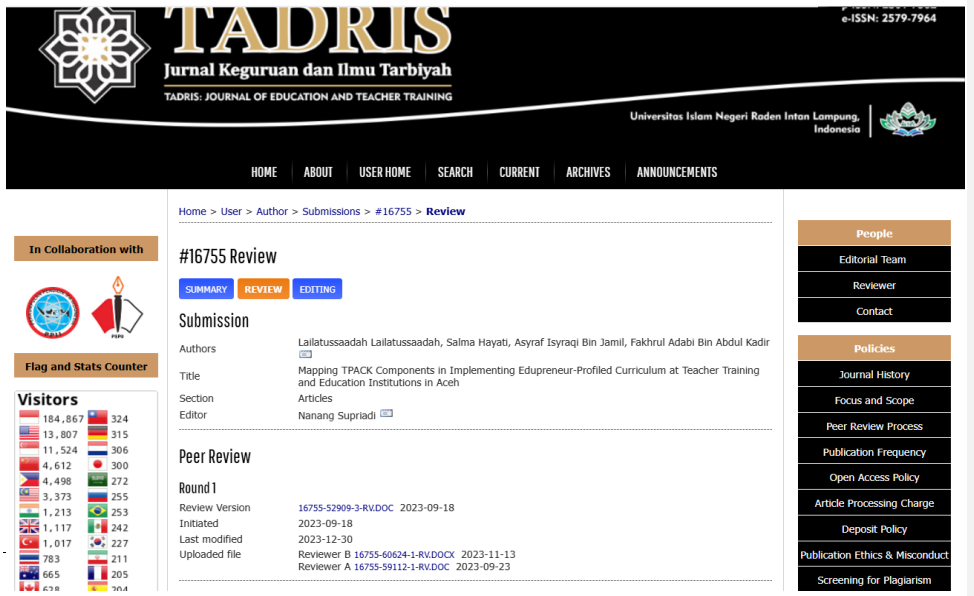

Mapping TPACK Components in the Implementation of Edupreneur-Profiled Curriculum at Teacher Training and Education Institutions in Aceh

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Abstract: This research aims to explore the mapping of Technological Pedagogical Content Knowledge (TPACK) components of instructors in implementing the edupreneur-profiled curriculum in Islamic Higher Education Institutions (PTKI) in Aceh. The researchers employed interview methods, observations, and document reviews involving three program heads and six instructors from three PTKIs in Aceh, namely UIN Ar-Raniry, IAIN Lhokseumawe, and STAIN Teungku Dirundang Meulaboh. Data analysis was conducted interactively. Instructors teaching edupreneurship-profiled courses have successfully integrated Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Knowledge (TK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TCK), and Technological Content Knowledge (TPK) as components of TPACK in their teaching practices. This research contributes to the mapping of these components, thereby aiding instructors in effectively implementing the entrepreneurship-profiled curriculum.

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INTRODUCTION

Entrepreneurship, as a pivotal academic subject, has garnered significant attention within higher education institutions. The focus on entrepreneurship aims to produce graduates who are better prepared to become job creators (Azwar, 2019). Moreover, this approach is anticipated to offer solutions to the escalating issue of unemployment in Indonesia (Marwanti et al., 2012; Sinaulan, 2019; Wijayanto & Ode, 2019). Nonetheless, research also highlights a disconcerting observation: the higher the level of education an individual attains, the lower their level of independence and entrepreneurial spirit (Ariska & Sahid, 2022; Siswoyo, 2009). Furthermore, the achievements of higher education are not entirely aligned with industry expectations (Wiratno, 2012).

The implementation of entrepreneurship education in higher education institutions faces substantial challenges, notably in terms of financial constraints and human resources (Adnan et al., 2020). Previous studies have demonstrated that incorporating entrepreneurship education at the tertiary level and cultivating a positive environment within the educational system can yield positive impacts, particularly in fostering an entrepreneurial culture and spirit (Bazan et al., 2020; Ciputra, 2007; Lailatussaadah et al., 2020; Sentoso, 2012; Subandi, 2015; Zubaedi, 2015).

To achieve these goals, the presence of faculty possessing Technological Pedagogical Content Knowledge (TPACK) is paramount. TPACK is a learning model derived from Pedagogical Content Knowledge (PCK), initially formulated by Shulman. TPACK integrates knowledge from four primary components pedagogical expertise, subject matter, student characteristics, and the contextual environment (Malik et al., 2019). This model introduces a technological dimension integrated with PCK, forming a framework that synthesizes knowledge of content, pedagogy, and technology.

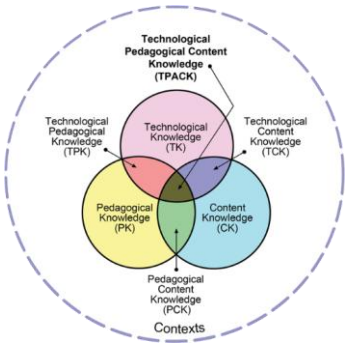

Figure 1. illustrates the TPACK framework (Koehler et al., 2013), depicting the interplay of technological knowledge, content, and pedagogical approaches.

In the context of entrepreneurship-focused coursework, the role of TPACK-equipped educators becomes pivotal in facilitating comprehensive knowledge absorption among students. Prior research has revealed that TPACK significantly influences the development of instructional materials (Sholihah et al.,

2016). Other findings indicate a positive correlation between instructional strategies of educators and their TPACK in pre-service teaching (Baran et al., 2019). Additional studies have underscored the positive impact of TPACK development, employing mobile devices for tailored student learning needs (Hossain et al., 2019).

While these studies contribute valuably, an in-depth investigation into the mapping of faculty TPACK within the context of edupreneurial profile curricula, particularly within islamic higher education institutions, remains absent. Responding to this backdrop, this study seeks to delve deeper into the effective TPACK formulation for implementing edupreneurial profile curricula in state islamic higher education institutions in the Aceh region. Empirical data from state islamic higher education institutions Aceh reveals the presence of entrepreneurship and edupreneurial courses, aimed at enabling students to master the procedure of identifying diverse entrepreneurial endeavors grounded in innovation and self-reliance, guided by Islamic values and principles, as well as local, national, and global perspectives.

Based on theoretical insights and empirical findings, this study endeavors to formulate an effective faculty TPACK model for executing edupreneurial profile curricula in educational institutions and educational personnel and state islamic higher education institutions Aceh.

METHOD

This study employs a qualitative descriptive approach to comprehensively delve into information regarding the research subjects, namely instructors who teach courses with an edupreneurial profile (Creswell, 2009). The research is conducted across three institutions, namely UIN Ar-Raniry, IAIN Lhokseumawe, and STAIN TDM Meulaboh. The research subjects are purposively selected, involving 15 instructors who teach edupreneurial-profiled curriculum within educational institutions, educational staff, and state Islamic universities.

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The collected data is analyzed using a qualitative analysis approach. This approach adopts the theory proposed by Miles et al. (2014) and encompasses a series of stages, including data collection, data reduction, data presentation, and drawing conclusions.

Firstly, data collection is conducted through techniques such as interviews, observations, and documentation, aligned with the research problem's focus. The data collected during this phase serves as the initial step in the qualitative analysis process.

Secondly, the data reduction phase involves sorting, grouping, and categorizing relevant data while eliminating irrelevant data. This step aims to organize the data to align with the research's focal points.

Thirdly, the reduced data is coherently presented according to the research's focus. This presentation process entails structuring data in a more organized and clear format to ensure the information is well understood.

Lastly, the conclusion-drawing stage aims to extract meaning from the obtained data and elucidate the findings that arise from the data. The ultimate objective of this stage is to formulate accurate and pertinent conclusions aligned with the research's objectives.

Hence, this qualitative analysis approach is utilized to comprehend the TPACK mapping of the instructors in implementing an edupreneurial-profiled curriculum within educational institutions, educational staff, and state Islamic universities in Aceh.

RESULT AND DISCUSSION

Each program of study at the three research locations offers several courses with an edupreneurship focus. The programs appoint instructors who possess the requisite expertise for these edupreneurship-focused courses. This aligns with the requirements for achieving Learning Outcomes (LO), wherein these instructors must possess the ability to design engaging, creative, innovative, technologically advanced, productive, and enjoyable course materials (Hayati, 2017; Hayati & Lailatussaadah, 2013).

To achieve this, the curriculum development process involves mapping out TPACK (Technological Pedagogical and Content Knowledge). In this process, we identify knowledge and competencies within Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Knowledge (TK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK), and Technological Content Knowledge (TCK). All of these components are integrated to form Technological Pedagogical and Content Knowledge (TPACK).

Technological Knowledge (TK)

Technology Knowledge refers to knowledge about various technologies, including software and hardware. The analysis results found that instructors of the course with an edu-preneurship profile possess technology knowledge characterized by the use and utilization of technology in teaching. In implementing their teaching, instructors with an edupreneurial profile respond to the media used in course delivery. Excerpts from interviews are as follows:

Excerpt 1: *"... I use PPT, Video, Canva, Youtube, Microsoft Office, and easily accessible email for students..."* (Lecture 1,2,3).

Excerpt 2: *"... I use online libraries like iPusnas, PPT, GCR, Youtube because they are not complicated to access and provide many references..."* (Lecture 3,4,6).

Excerpt 3: *"... I use PPT, academia edu, Vidgram, Video Conference, e-learning, youtube, Canvas because once opened, they provide many other references..."* (Lecture 1-6).

In this context, the technology used is as shown in Figure 2 below.

Figure 2. Use of Technology in Edupreneur-Profiled Courses

Based on Figure 2, it can be seen that instructors of courses with an edupreneurial profile use a variety of technologies in their teaching. The research findings indicate that instructors use email, WhatsApp, Google Classroom, Canvas, Microsoft Office, simple and interactive PPTs, video, Vidgram, video conferencing, e-learning, YouTube, iPusnas, academia edu, and Canva. Technology plays a crucial role in the higher education learning process (Ahmad et al., 2020; Fernández-Batanero et al., 2022; Indrajit, 2011; Trevisan et al., 2023).

Content Knowledge (CK)

Content knowledge is related to the subject matter taught. The analysis of content knowledge (CK) of instructors in edupreneur-profiled courses reveals that instructors possess expertise and knowledge related to the subjects they teach. This is based on interview data that indicate instructors teaching edupreneur-profiled courses have educational qualifications that align with the field they teach. For example, courses like "Project Management and Marketing," "Event Management," and "Entrepreneurship" are taught by instructors with Master's degrees in Management. Additionally, these instructors often have experience in specific business ventures. In general, instructors in edupreneurship-based courses provide similar responses. Here are excerpts from interviews with instructors:

Excerpt 1: *"... I develop teaching materials, starting with creating content on entrepreneurship in general. Then, I proceed with facts about the importance of entrepreneurship. Conceptually, I also teach students to classify or categorize forms of businesses that can be considered entrepreneurial. Besides, I ask students to follow the steps to become entrepreneurs capable of solving current national issues. Finally, I ask students to assess themselves, build strategies to become entrepreneurs who can thrive and develop themselves and their businesses. I source my teaching materials from e-journals, books, and also from YouTube because this course involves practical aspects often found on YouTube. Sometimes, it also comes from personal experience or insights from friends who have their own businesses..."* (Lecture 1).

In packaging teaching materials, instructors in edupreneur-profiled courses develop their materials according to the characteristics of the course. Teaching materials for these courses encompass various

components, including factual, conceptual, principle-based, procedural, and metacognitive elements, reflecting the breadth, depth, and contextual nature of material development (Tomlinson, 2013). The research findings are represented in Figure 3.

Figure 3. Development of Teaching Materials in Edupreneur-Profiled Courses

Figure 3 provides an overview of the development of teaching materials in edupreneur-profiled courses. In the process of developing teaching materials, instructors in these courses use references from various sources, both non-digital and digital. Non-digital sources include books, modules/teaching materials, and input from entrepreneurship experts/business owners. Digital sources include e-modules, e-journals, YouTube tutorials, and e-learning platforms. The use of e-learning is believed to support learning (Sherrin, 2020; Syahputra & Saragih, 2021). Visually, the references used in material development can be seen in Figure 4.

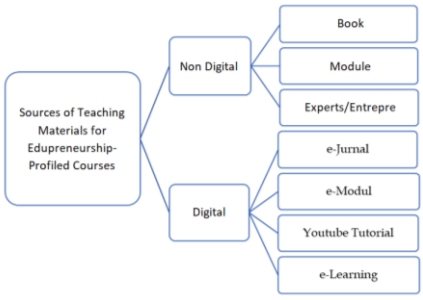

Figure 4. Sources for Developing Teaching Materials in Edupreneur-Profiled Courses

Pedagogical Knowledge (PK)

Pedagogical knowledge refers to knowledge related to the general processes of teaching and learning, including assessment, student engagement, and classroom management (Abdullah et al., 2023). Research results related to the pedagogical knowledge (PK) of instructors in edupreneur-profiled courses indicate that these instructors possess pedagogical knowledge, allowing them to conduct their courses effectively. This is evident in the documentation of semester course planning and open-ended questionnaire data. Some excerpts from the interviews are as follows:

Excerpt 1: *"... I design semester course planning and develop it every semester because there are always new material developments based on the latest sources, using appropriate methods because this course involves a lot of practical aspects..."* (Lecture 1-6).

Excerpt 2: *"... I develop semester course planning, teaching materials, and learning media based on students' needs. Because the needs vary every year..."* (Lecture 1-6).

Excerpt 3: *"... I create semester course planning according to the LO and program profile, but I develop course learning outcomes based on the current material developments..."* (Lecture 1-4).

Excerpt 4: *"... I design plans, appropriate teaching materials, user-friendly teaching media, and create authentic assessments to evaluate comprehensively..."* (Lecture 2-6).

Pedagogically, instructors conduct their courses by adhering to the program's curriculum and then designing a course plan, including preparing semester course planning, planning course activities, preparing teaching materials, preparing media to be used in the teaching process, and planning course assessments. Analysis of instructors' semester course planning reveals that well-designed semester course planning includes clear and practical components, such as identity, Learning Outcomes, course learning outcomes, course descriptions, learning activity matrices, references, assignments (structured and independent assignments), and assessments. Course planning is essential as a framework and reference for both instructors and students in conducting the course (Nasution, 2017; Suryadi & Mushlih, 2019). Visually, the course planning for edupreneur-profiled courses by instructors is depicted in Figure 5.

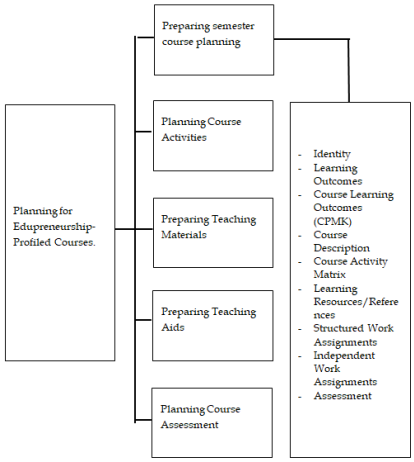

Figure 5. Edupreneur-Profiled Course Planning by Instructors

During the course implementation stage, based on documentation and questionnaire data, it is evident that instructors of edupreneur-profiled courses employ various methods, techniques, and media in their teaching. The research findings indicate several methods used by instructors, including demonstration, simulation, practical techniques, workshops, assignments, field trips, discussions, and question-and-answer sessions. Here are forms of activities conducted based on these teaching methods:

1. The form of demonstration method includes demonstrations of creating media, marketing, service models, and product demonstrations during market day activities.
2. The form of simulation method includes simulating media usage at bazaars, simulating products through videos, simulating the marketing process through role-playing as sellers, buyers, and evaluators, as well as using applications like Paypazz/PhET simulation.
3. The practical technique involves practical exercises in creating media, producing and marketing products, modeling services, educational project practices, event modeling in the form of student conferences, cultural events, and bazaars, as well as creating products using recycled materials.
4. Workshops are used for guiding media creation and entrepreneurship skills workshops, such as handicraft making.
5. Assignments include individual and group tasks for creating media, generating ideas and turning them into products, creating service model instruments, public relations activities, educational projects, event creation tasks, assignments to produce and market hand sanitizers and masks, creating media tasks using applications like Macromedia SX4, and tasks to create sellable products.
6. Field trips involve visiting various business establishments.
7. Discussions occur during the teaching process, both during content delivery and after skill-based learning activities.
8. Question-and-answer sessions are conducted during the teaching process, both during content delivery and skill-based learning activities.

Visually, the course activities for edupreneur-profiled courses conducted by instructors are represented in Figure 6.

Figure 6. Edupreneur-Profiled Course Activities

The methods employed by instructors in edupreneur-profiled courses indicate that the courses are conducted actively, with students playing a central role. These methods emphasize practical experience. Pittaway & Thorpe (2012) and Pittaway & Cope (2007) emphasize that entrepreneurship education should be action-oriented to provide learners with experiential learning. Even Gibb (1965) suggests that it should be done through a prediction approach (effectual reasoning). Other studies have found that entrepreneurship teaching methods include simulation, video and film methods, case studies, workshops, project-based methods, group discussions, and team-based learning (Michaelsen et al., 2008).

In the evaluation stage, based on the data obtained, instructors of edupreneur-profiled courses plan assessments to measure students' attitudes, knowledge, and skills. In conducting assessments, instructors use various assessment techniques, including observation, oral and written tests, assignments, projects, products, and practical assessments. Assessments are predominantly used to measure students' cognitive competencies in the edupreneurship course they are teaching. However, authentic assessment is essential to measure cognitive, affective, and psychomotor domains (Imaduddin & Zuhaida, 2019; Sakti, 2022). Visually, the assessment activities for edupreneur-profiled courses are depicted in Figure 7.

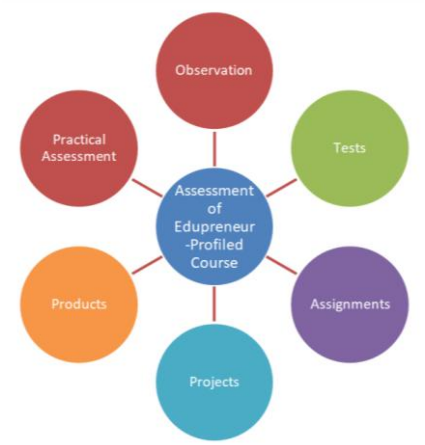

Figure 7. Edupreneur-Profiled Course Assessment Activities

Pedagogical Content Knowledge (PCK)

Pedagogical Content Knowledge (PCK) refers to knowledge that integrates the delivery model of teaching, combining subject matter and pedagogy. The PCK competence of educators who specialize in edupreneur-profiled courses can be observed in research data, where instructors integrate two components, namely pedagogy and subject matter, in their teaching. In interviews, these educators express:

"...I design course materials in various forms, including information technology, books, various online learning resources, and scientific activities such as market research, exploring market trends, presenting data for analysis, and applying a scientific approach to determine the depth of the subject matter..."

Course materials for edupreneur-profiled courses, which have been extensively and deeply developed through modules, textbooks, or other means, are taught in specific ways, using methods, models, techniques, and so on, in accordance with pre-established plans. Materials presented in appropriate formats and tools can serve as scaffolding and reflective organization of the relationship between pedagogy and subject matter (Hauerwas et al., 2023; Nilsson & Karlsson, 2019).

Course materials are packaged in the form of books, modules/teaching materials, and experts/entrepreneurs, and are delivered to students through prior planning, followed by the implementation of the teaching plan. Visually, the implementation of PCK by instructors of edupreneur-profiled courses can be seen in Figure 8 below.

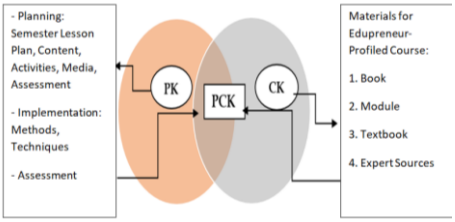

Figure 8. Implementation of Pedagogical Content Knowledge for Edupreneur-Profiled Courses

Technological Content Knowledge **(TCK)**

Technological Content Knowledge, which encompasses knowledge of how technology can be used to represent course content and transform how learners interact with concepts, is evident in the knowledge of instructors teaching edupreneur-profiled courses, as revealed through research data. In response to their knowledge of using technology, instructors stated:

"At present, we are certainly required to use technology in various aspects, especially in teaching. Especially during the COVID-19 pandemic, all activities were conducted online, which required technology. So, automatically, we had to learn to use technology in all teaching and learning activities."

As found by (Tseng et al., 2022), the technological knowledge of instructors can influence students' mastery of the subject matter. Similar findings were mentioned by (Martha et al., 2018).

Instructors deliver or transfer materials, including factual, conceptual, principled, procedural, and metacognitive knowledge, by utilizing technology in preparing and implementing the content.

Comprehensive coverage of the material in such teaching can be easily achieved by mastering technology (Vukić et al., 2020).

Learning materials are packaged through e-modules, e-journals, YouTube tutorials, PowerPoint presentations (both simple and interactive), as well as e-learning. In this context, students interact with technology to acquire knowledge, facilitated by instructors. Visually, the implementation of TCK by instructors of edupreneur-profiled courses can be seen in Figure 9 below.

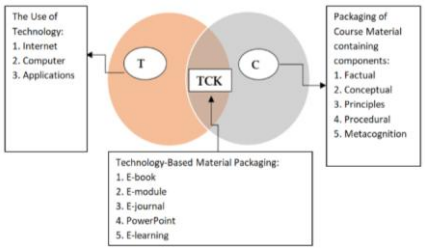

Figure 9. Implementation of Technological Content Knowledge for Edupreneur-Profiled Courses

***Technological Pedagogical Knowledge* (TPK)**

Technological Pedagogical Knowledge (TPK) refers to knowledge related to how technology can be used in teaching and learning. Understanding the teaching and learning process can change when specific technologies are used in particular ways. Excerpts from interviews with instructors regarding their knowledge of technology usage in teaching are presented as follows:

"...I use various methods and also utilize digital media in teaching..."

The TPK of instructors teaching edupreneur-profiled courses can be discerned from the course implementation process. Instructors plan and conduct their courses using technology. The current advancement in technology necessitates instructors to be capable of integrating technology into their teaching (Graeske & Sjöberg, 2021; Mahyiddin & Amin, 2022). (Shinas et al., 2013) stated that technology influences teaching and learning. Visually, the implementation of TPK by instructors of edupreneur-profiled courses can be seen in Figure 10 below.

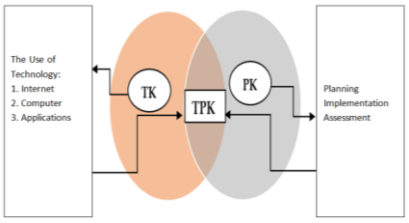

Figure 10. Implementation of Technological Pedagogical Knowledge for Edupreneur-Profiled Courses

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CONCLUSION

Mapping the Technological Pedagogical Content Knowledge components in the Implementation of Edupreneurship-Profiled Courses includes Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Knowledge (TK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TCK), and Technological Content Knowledge (TPK). The Pedagogical Content Knowledge of instructors teaching edupreneurship-profiled courses begins with planning, implementation, and assessment, as well as the development of materials in the form of modules, textbooks, and expert sources. Technological Pedagogical Knowledge, performed by instructors of edupreneurship-profiled courses, involves packaging technology-based materials such as e-books, e-modules, e-journals, simple and interactive PowerPoint presentations, and e-learning. Meanwhile, the Technological Content Knowledge carried out includes planning, implementation, and assessment of technology-enhanced learning, utilizing internet, computers, and applications. This research is limited to mapping instructors'

Technological Pedagogical Content Knowledge in the context of edupreneurship-profiled courses, and a Technological Pedagogical Content Knowledge framework for entrepreneurship courses has not been formulated yet. Such a framework could serve as a guideline for the effective implementation of entrepreneurship courses, benefiting students as subjects in the course.

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Mapping TPACK Components in the Implementation of Edupreneur-Profiled Curriculum at Teacher Training and Education Institutions in Aceh

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***Correspondence Address:**

Abstract: This research aims to explore the mapping of Technological Pedagogical Content Knowledge (TPACK) components of instructors in implementing the edupreneur-profiled curriculum in Islamic Higher Education Institutions (PTKI) in Aceh. The researchers employed interview methods, observations, and document reviews involving three program heads and six instructors from three PTKIs in Aceh, namely UIN Ar-Raniry, IAIN Lhokseumawe, and STAIN Teungku Dirundang Meulaboh. Data analysis was conducted interactively. Instructors teaching edupreneurship-profiled courses have successfully integrated Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Knowledge (TK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TCK), and Technological Content Knowledge (TPK) as components of TPACK in their teaching practices. This research contributes to the mapping of

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these components, thereby aiding instructors in effectively implementing the entrepreneurship-profiled curriculum.

INTRODUCTION

Entrepreneurship, as a pivotal academic subject, has garnered significant attention within higher education institutions. The focus on entrepreneurship aims to produce graduates who are better prepared to become job creators (Azwar, 2019). Moreover, this approach is anticipated to offer solutions to the escalating issue of unemployment in Indonesia (Marwanti et al., 2012; Sinaulan, 2019; Wijayanto & Ode, 2019). Nonetheless, research also highlights a disconcerting observation: the higher the level of education an individual attains, the lower their level of independence and entrepreneurial spirit (Ariska & Sahid, 2022; Siswoyo, 2009). Furthermore, the achievements of higher education are not entirely aligned with industry expectations (Wiratno, 2012).

The implementation of entrepreneurship education in higher education institutions faces substantial challenges, notably in terms of financial constraints and human resources (Adnan et al., 2020). Previous studies have demonstrated that incorporating entrepreneurship education at the tertiary level and cultivating a positive environment within the educational system can yield positive impacts, particularly in fostering an entrepreneurial culture and spirit (Bazan et al., 2020; Ciputra, 2007; Lailatussaadah et al., 2020; Sentoso, 2012; Subandi, 2015; Zubaedi, 2015).

To achieve these goals, the presence of faculty possessing Technological Pedagogical Content Knowledge (TPACK) is paramount. TPACK is a learning model derived from Pedagogical Content Knowledge (PCK), initially formulated by Shulman. TPACK integrates knowledge from four primary components pedagogical expertise, subject matter, student characteristics, and the contextual environment (Malik et al., 2019). This model introduces a technological dimension integrated with PCK, forming a framework that synthesizes knowledge of content, pedagogy, and technology.

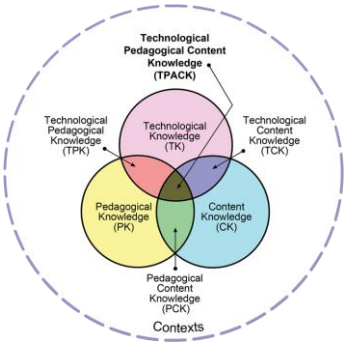

Figure 1. illustrates the TPACK framework (Koehler et al., 2013), depicting the interplay of technological knowledge, content, and pedagogical approaches.

In the context of entrepreneurship-focused coursework, the role of TPACK-equipped educators becomes pivotal in facilitating comprehensive knowledge absorption among students. Prior research has revealed that TPACK significantly influences the development of instructional materials (Sholihah et al.,

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2016). Other findings indicate a positive correlation between instructional strategies of educators and their TPACK in pre-service teaching (Baran et al., 2019). Additional studies have underscored the positive impact of TPACK development, employing mobile devices for tailored student learning needs (Hossain et al., 2019).

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While these studies contribute valuably, an in-depth investigation into the mapping of faculty TPACK within the context of edupreneurial profile curricula, particularly within islamic higher education institutions, remains absent. Responding to this backdrop, this study seeks to delve deeper into the effective TPACK formulation for implementing edupreneurial profile curricula in state islamic higher education institutions in the Aceh region. Empirical data from state islamic higher education institutions Aceh reveals the presence of entrepreneurship and edupreneurial courses, aimed at enabling students to master the procedure of identifying diverse entrepreneurial endeavors grounded in innovation and self-reliance, guided by Islamic values and principles, as well as local, national, and global perspectives.

Based on theoretical insights and empirical findings, this study endeavors to formulate an effective faculty TPACK model for executing edupreneurial profile curricula in educational institutions and educational personnel and state islamic higher education institutions Aceh.

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METHOD

This study employs a qualitative descriptive approach to comprehensively delve into information regarding the research subjects, namely instructors who teach courses with an edupreneurial profile (Creswell, 2009). The research is conducted across three institutions, namely UIN Ar-Raniry, IAIN Lhokseumawe, and STAIN TDM Meulaboh. The research subjects are purposively selected, involving 15 instructors who teach edupreneurial-profiled curriculum within educational institutions, educational staff, and state Islamic universities.

The collected data is analyzed using a qualitative analysis approach. This approach adopts the theory proposed by (Miles et al., 2014) and encompasses a series of stages, including data collection, data reduction, data presentation, and drawing conclusions.

Firstly, data collection is conducted through techniques such as interviews, observations, and documentation, aligned with the research problem's focus. The data collected during this phase serves as the initial step in the qualitative analysis process.

Secondly, the data reduction phase involves sorting, grouping, and categorizing relevant data while eliminating irrelevant data. This step aims to organize the data to align with the research's focal points.

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Thirdly, the reduced data is coherently presented according to the research's focus. This presentation process entails structuring data in a more organized and clear format to ensure the information is well understood.

Lastly, the conclusion-drawing stage aims to extract meaning from the obtained data and elucidate the findings that arise from the data. The ultimate objective of this stage is to formulate accurate and pertinent conclusions aligned with the research's objectives.

Hence, this qualitative analysis approach is utilized to comprehend the TPACK mapping of the instructors in implementing an edupreneurial-profiled curriculum within educational institutions, educational staff, and state Islamic universities in Aceh.

RESULT AND DISCUSSION

Each program of study at the three research locations offers several courses with an edupreneurship focus. The programs appoint instructors who possess the requisite expertise for these edupreneurship-focused courses. This aligns with the requirements for achieving Learning Outcomes (LO), wherein these instructors must possess the ability to design engaging, creative, innovative, technologically advanced, productive, and enjoyable course materials (Hayati, 2017; Hayati & Lailatussaadah, 2013).

To achieve this, the curriculum development process involves mapping out TPACK (Technological Pedagogical and Content Knowledge). In this process, we identify knowledge and competencies within Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Knowledge (TK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TPK), and Technological Content Knowledge (TCK). All of these components are integrated to form Technological Pedagogical and Content Knowledge (TPACK).

Technological Knowledge (TK)

Technology Knowledge refers to knowledge about various technologies, including software and hardware. The analysis results found that instructors of the course with an edu-preneurship profile possess technology knowledge characterized by the use and utilization of technology in teaching. In implementing their teaching, instructors with an edupreneurial profile respond to the media used in course delivery. Excerpts from interviews are as follows:

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Excerpt 1: *"... I use PPT, Video, Canva, Youtube, Microsoft Office, and easily accessible email for students..."* (Lecture 1,2,3).

Excerpt 2: *"... I use online libraries like iPusnas, PPT, GCR, Youtube because they are not complicated to access and provide many references..."* (Lecture 3,4,6).

Excerpt 3: *"... I use PPT, academia edu, Vidgram, Video Conference, e-learning, youtube, Canvas because once opened, they provide many other references..."* (Lecture 1-6).

In this context, the technology used is as shown in Figure 2 below.

Figure 2. Use of Technology in Edupreneur-Profiled Courses

Based on Figure 2, it can be seen that instructors of courses with an edupreneurial profile use a variety of technologies in their teaching. The research findings indicate that instructors use email, WhatsApp, Google Classroom, Canvas, Microsoft Office, simple and interactive PPTs, video, Vidgram, video conferencing, e-learning, YouTube, iPusnas, academia edu, and Canva. Technology plays a crucial role in the higher education learning process (Ahmad et al., 2020; Fernández-Batanero et al., 2022; Indrajit, 2011; Trevisan et al., 2023).

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Content Knowledge (CK)

Content knowledge is related to the subject matter taught. The analysis of content knowledge (CK) of instructors in edupreneur-profiled courses reveals that instructors possess expertise and knowledge related to the subjects they teach. This is based on interview data that indicate instructors teaching edupreneur-profiled courses have educational qualifications that align with the field they teach. For example, courses like "Project Management and Marketing," "Event Management," and "Entrepreneurship" are taught by instructors with Master's degrees in Management. Additionally, these instructors often have experience in specific business ventures. In general, instructors in edupreneurship-based courses provide similar responses. Here are excerpts from interviews with instructors:

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Excerpt 1: *"... I develop teaching materials, starting with creating content on entrepreneurship in general. Then, I proceed with facts about the importance of entrepreneurship. Conceptually, I also teach students to classify or categorize forms of businesses that can be considered entrepreneurial. Besides, I ask students to follow the steps to become entrepreneurs capable of solving current national issues. Finally, I ask students to assess themselves, build strategies to become entrepreneurs who can thrive and develop themselves and their businesses. I source my teaching materials from e-journals, books, and also from YouTube because this course involves practical aspects often found on YouTube. Sometimes, it also comes from personal experience or insights from friends who have their own businesses..."* (Lecture 1).

In packaging teaching materials, instructors in edupreneur-profiled courses develop their materials according to the characteristics of the course. Teaching materials for these courses encompass various

components, including factual, conceptual, principle-based, procedural, and metacognitive elements, reflecting the breadth, depth, and contextual nature of material development (Tomlinson, 2013). The research findings are represented in Figure 3.

Figure 3. Development of Teaching Materials in Edupreneur-Profiled Courses

Figure 3 provides an overview of the development of teaching materials in edupreneur-profiled courses. In the process of developing teaching materials, instructors in these courses use references from various sources, both non-digital and digital. Non-digital sources include books, modules/teaching materials, and input from entrepreneurship experts/business owners. Digital sources include e-modules, e-journals, YouTube tutorials, and e-learning platforms. The use of e-learning is believed to support learning (Sherrin, 2020; Syahputra & Saragih, 2021). Visually, the references used in material development can be seen in Figure 4.

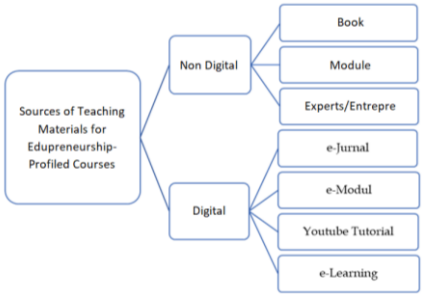

Figure 4. Sources for Developing Teaching Materials in Edupreneur-Profiled Courses

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Pedagogical Knowledge (PK)

Pedagogical knowledge refers to knowledge related to the general processes of teaching and learning, including assessment, student engagement, and classroom management (Abdullah et al., 2023). Research results related to the pedagogical knowledge (PK) of instructors in edupreneur-profiled courses indicate that these instructors possess pedagogical knowledge, allowing them to conduct their courses effectively. This is evident in the documentation of semester course planning and open-ended questionnaire data. Some excerpts from the interviews are as follows:

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Excerpt 1: *"... I design semester course planning and develop it every semester because there are always new material developments based on the latest sources, using appropriate methods because this course involves a lot of practical aspects..."* (Lecture 1-6).

Excerpt 2: *"... I develop semester course planning, teaching materials, and learning media based on students' needs. Because the needs vary every year..."* (Lecture 1-6).

Excerpt 3: *"... I create semester course planning according to the LO and program profile, but I develop course learning outcomes based on the current material developments..."* (Lecture 1-4).

Excerpt 4: *"... I design plans, appropriate teaching materials, user-friendly teaching media, and create authentic assessments to evaluate comprehensively..."* (Lecture 2-6).

Pedagogically, instructors conduct their courses by adhering to the program's curriculum and then designing a course plan, including preparing semester course planning, planning course activities, preparing teaching materials, preparing media to be used in the teaching process, and planning course assessments. Analysis of instructors' semester course planning reveals that well-designed semester course planning includes clear and practical components, such as identity, Learning Outcomes, course learning outcomes, course descriptions, learning activity matrices, references, assignments (structured and independent assignments), and assessments. Course planning is essential as a framework and reference for both instructors and students in conducting the course (Nasution, 2017; Suryadi & Mushlih, 2019). Visually, the course planning for edupreneur-profiled courses by instructors is depicted in Figure 5.

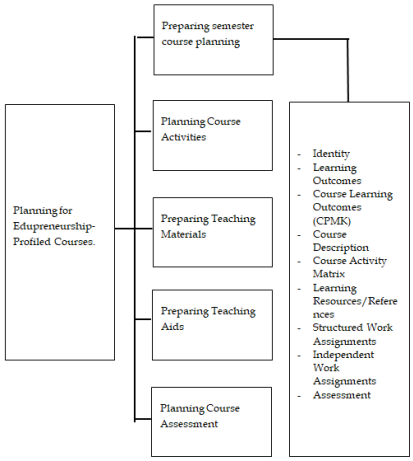

Figure 5. Edupreneur-Profiled Course Planning by Instructors

During the course implementation stage, based on documentation and questionnaire data, it is evident that instructors of edupreneur-profiled courses employ various methods, techniques, and media in their teaching. The research findings indicate several methods used by instructors, including demonstration, simulation, practical techniques, workshops, assignments, field trips, discussions, and question-and-answer sessions. Here are forms of activities conducted based on these teaching methods:

9. The form of demonstration method includes demonstrations of creating media, marketing, service models, and product demonstrations during market day activities.
10. The form of simulation method includes simulating media usage at bazaars, simulating products through videos, simulating the marketing process through role-playing as sellers, buyers, and evaluators, as well as using applications like Paypazz/PhET simulation.
11. The practical technique involves practical exercises in creating media, producing and marketing products, modeling services, educational project practices, event modeling in the form of student conferences, cultural events, and bazaars, as well as creating products using recycled materials.
12. Workshops are used for guiding media creation and entrepreneurship skills workshops, such as handicraft making.
13. Assignments include individual and group tasks for creating media, generating ideas and turning them into products, creating service model instruments, public relations activities, educational projects, event creation tasks, assignments to produce and market hand sanitizers and masks, creating media tasks using applications like Macromedia SX4, and tasks to create sellable products.
14. Field trips involve visiting various business establishments.
15. Discussions occur during the teaching process, both during content delivery and after skill-based learning activities.
16. Question-and-answer sessions are conducted during the teaching process, both during content delivery and skill-based learning activities.

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Commented [RR20]: Can you mention workshops in details?

Visually, the course activities for edupreneur-profiled courses conducted by instructors are represented in Figure 6.

Figure 6. Edupreneur-Profiled Course Activities

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The methods employed by instructors in edupreneur-profiled courses indicate that the courses are conducted actively, with students playing a central role. These methods emphasize practical experience. Pittaway & Thorpe (2012) and Pittaway & Cope (2007) emphasize that entrepreneurship education should be action-oriented to provide learners with experiential learning. Even Gibb (1965) suggests that it should be done through a prediction approach (effectual reasoning). Other studies have found that entrepreneurship teaching methods include simulation, video and film methods, case studies, workshops, project-based methods, group discussions, and team-based learning (Michaelsen et al., 2008).

In the evaluation stage, based on the data obtained, instructors of edupreneur-profiled courses plan assessments to measure students' attitudes, knowledge, and skills. In conducting assessments, instructors use various assessment techniques, including observation, oral and written tests, assignments, projects, products, and practical assessments. Assessments are predominantly used to measure students' cognitive competencies in the edupreneurship course they are teaching. However, authentic assessment is essential to measure cognitive, affective, and psychomotor domains (Imaduddin & Zuhaida, 2019; Sakti, 2022). Visually, the assessment activities for edupreneur-profiled courses are depicted in Figure 7.

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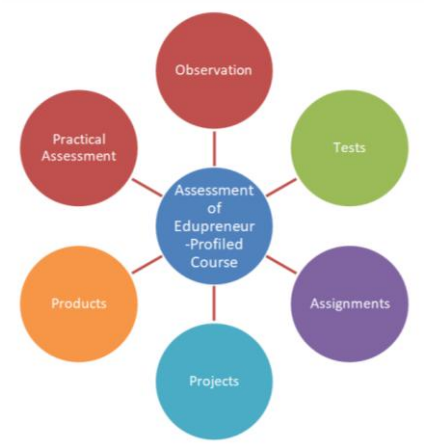

Figure 7. Edupreneur-Profiled Course Assessment Activities

Pedagogical Content Knowledge (PCK)

Pedagogical Content Knowledge (PCK) refers to knowledge that integrates the delivery model of teaching, combining subject matter and pedagogy. The PCK competence of educators who specialize in edupreneur-profiled courses can be observed in research data, where instructors integrate two components, namely pedagogy and subject matter, in their teaching. In interviews, these educators express:

"...I design course materials in various forms, including information technology, books, various online learning resources, and scientific activities such as market research, exploring market trends, presenting data for analysis, and applying a scientific approach to determine the depth of the subject matter..."

Course materials for edupreneur-profiled courses, which have been extensively and deeply developed through modules, textbooks, or other means, are taught in specific ways, using methods, models, techniques, and so on, in accordance with pre-established plans. Materials presented in appropriate formats and tools can serve as scaffolding and reflective organization of the relationship between pedagogy and subject matter (Hauerwas et al., 2023; Nilsson & Karlsson, 2019).

Course materials are packaged in the form of books, modules/teaching materials, and experts/entrepreneurs, and are delivered to students through prior planning, followed by the implementation of the teaching plan. Visually, the implementation of PCK by instructors of edupreneur-profiled courses can be seen in Figure 8 below.

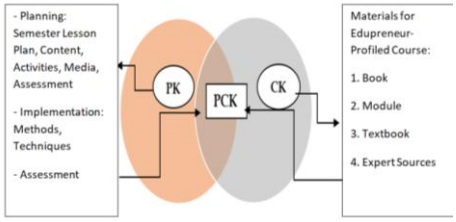

Figure 8. Implementation of Pedagogical Content Knowledge for Edupreneur-Profiled Courses

Technological Content Knowledge **(TCK)**

Technological Content Knowledge, which encompasses knowledge of how technology can be used to represent course content and transform how learners interact with concepts, is evident in the knowledge of instructors teaching edupreneur-profiled courses, as revealed through research data. In response to their knowledge of using technology, instructors stated:

"At present, we are certainly required to use technology in various aspects, especially in teaching. Especially during the COVID-19 pandemic, all activities were conducted online, which required technology. So, automatically, we had to learn to use technology in all teaching and learning activities."

As found by (Tseng et al., 2022), the technological knowledge of instructors can influence students' mastery of the subject matter. Similar findings were mentioned by (Martha et al., 2018).

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Instructors deliver or transfer materials, including factual, conceptual, principled, procedural, and metacognitive knowledge, by utilizing technology in preparing and implementing the content.

Comprehensive coverage of the material in such teaching can be easily achieved by mastering technology (Vukić et al., 2020).

Learning materials are packaged through e-modules, e-journals, YouTube tutorials, PowerPoint presentations (both simple and interactive), as well as e-learning. In this context, students interact with technology to acquire knowledge, facilitated by instructors. Visually, the implementation of TCK by instructors of edupreneur-profiled courses can be seen in Figure 9 below.

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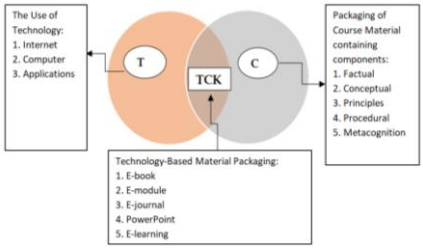

Figure 9. Implementation of Technological Content Knowledge for Edupreneur-Profiled Courses

***Technological Pedagogical Knowledge* (TPK)**

Technological Pedagogical Knowledge (TPK) refers to knowledge related to how technology can be used in teaching and learning. Understanding the teaching and learning process can change when specific technologies are used in particular ways. Excerpts from interviews with instructors regarding their knowledge of technology usage in teaching are presented as follows:

"...I use various methods and also utilize digital media in teaching..."

The TPK of instructors teaching edupreneur-profiled courses can be discerned from the course implementation process. Instructors plan and conduct their courses using technology. The current advancement in technology necessitates instructors to be capable of integrating technology into their teaching (Graeske & Sjöberg, 2021; Mahyiddin & Amin, 2022). (Shinas et al., 2013) stated that technology influences teaching and learning. Visually, the implementation of TPK by instructors of edupreneur-profiled courses can be seen in Figure 10 below.

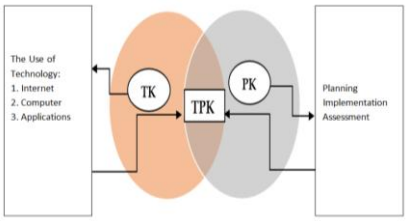

Figure 10. Implementation of Technological Pedagogical Knowledge for Edupreneur-Profiled Courses

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CONCLUSION

Mapping the Technological Pedagogical Content Knowledge components in the Implementation of Edupreneurship-Profiled Courses includes Content Knowledge (CK), Pedagogical Knowledge (PK), Technological Knowledge (TK), Pedagogical Content Knowledge (PCK), Technological Pedagogical Knowledge (TCK), and Technological Content Knowledge (TPK). The Pedagogical Content Knowledge of instructors teaching edupreneurship-profiled courses begins with planning, implementation, and assessment, as well as the development of materials in the form of modules, textbooks, and expert sources. Technological Pedagogical Knowledge, performed by instructors of edupreneurship-profiled courses, involves packaging technology-based materials such as e-books, e-modules, e-journals, simple and interactive PowerPoint presentations, and e-learning. Meanwhile, the Technological Content Knowledge carried out includes planning, implementation, and assessment of technology-enhanced learning, utilizing internet, computers, and applications. This research is limited to mapping instructors'

Technological Pedagogical Content Knowledge in the context of edupreneurship-profiled courses, and a Technological Pedagogical Content Knowledge framework for entrepreneurship courses has not been formulated yet. Such a framework could serve as a guideline for the effective implementation of entrepreneurship courses, benefiting students as subjects in the course.

ACKNOWLEDGMENT

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Integrating Islamic Values into Science Learning in Indonesian Islamic Higher Education: Expectation and Implementation

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Abstract: In recent years, there have been increasing discussions on integrative sciences in State Islamic Higher Education institutions, locally called Perguruan Tinggi Keagamaan Islam Negeri (PTKIN). This study aimed at analyzing the expectations and implementation of the integrating Islamic values in lecturers of PTKINs in Aceh. This qualitative descriptive approach involved three deputy deans for academic affairs, nine lecturers, and 12 students from 3 PTKINs in Aceh. Data collection was through interview and observation, document analysis (curriculum, books, standard operating procedures (SOPs), and Rencana Pembelajaran Semesters (RPS) or semesterly lesson plans). The results revealed that integrating Islamic values into the sciences was very diverse in each PTKIN in Aceh. The lecturers had different views and interpretations of the paradigm of integrating Islamic values into learning regarding the boundaries and the concepts applied. Besides, there were no written standard rules and policies (SOP) on integrating Islamic values and limited references used by lecturers in implementing science learning that integrates Islamic

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values. This study concluded that science integration at PTKINs in Aceh had not been consistently carried out, affecting the implemented level that may, in turn, affect the students' learning.

***Correspondence Address:**

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INTRODUCTION

Aceh is an Indonesian province where sharia law has been implemented for several decades. The implementation of Islamic *sharia* is expected to affect all aspects of life, including education in the higher education institutions, through rearranging the Acehnese high education system by incorporating local content values (Mujiburrahman et al., 2017). In supporting the implementation of the law in the so-called Veranda of Mecca province, PTKINs are responsible for integrating Islamic values into the sciences courses they offer. Lecturers must have a good perception of integrating Islamic values into the courses they teach because, as Fullan (2016) posited, their understanding influences the implementation in the actual classroom and students' learning.

In the Aceh context, integrating Islamic values into sciences is based on several regulations. They include Law no. 44 of 1999, Law no. 18 of 2001, Undang-Undang Pemerintah Aceh (UUPA) No. 11 2006, Canon No. 5 of 2008 article 5 paragraph 2. The conversion of several private Islamic universities in Aceh, the change of status of Islamic higher education institutions from Institut Agama Islam Negeri (IAIN) Ar-Raniry to Universitas Islam Negeri (UIN) Ar-Raniry is a form of academic concern for the government, academics, and education practitioners in implementing the UUPA and Islamic law in a philosophical frame, *Pancasila* and the plurality of the Indonesian nation. Hence, the typical Acehnese education (sharia-based) integrating Islamic values into curricula of all PTKINs in Aceh is a solution to these problems. This kind of education needs to be implemented in Aceh to eliminate the dichotomy of sciences and Islam, and it needs to be integrated holistically (Tajuddin & Hj Rofie, 2014).

One that is being actively developed at PTKINs in Aceh is the concept of integrating Islamic religious values into science which is manifested through the implementation of integrative science learning. It is necessary to remember that science and religion tend to be separated in decades due to positivistic views. However, in reality, the two are inseparable units. In the context of PTKIN, the integration of religion and science is different from that in public universities (Compiler, 2018).

Several factors support the concept of implementing integrative science learning at PTKIN in Aceh. First is implementing the Indonesian Qualification Framework (IQF) that requires the KKNI curriculum to shape human resources with Indonesian character, religious, superior, and noble characters. Implementing integrative science learning at PTKIN is expected to reach the goal (Guessoum, 2014; Zarkasih et al., 2020). Second, PTKIN in Aceh has Islamic-based visions and missions, as seen from the visions and missions launched by three PTKINs located in Aceh. The inclusion of the terms as scientific integration, religious people, world-class university, and global insight in the vision and mission, even though it feels like a

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trending topic among PTKIN (Chotimah & Fathurrahman, 2014), is positive. PTKIN Aceh's vision is in line with the slogans *Aceh Caroeng* (Smart Aceh), *Aceh Teug*a (strong Aceh), and *Aceh Malem* (Islamic Religious Aceh) programs launched by the Aceh government (Aceh, 2017). Thus, the need for the implementation of integrative learning is a necessity. Third, Science education aims to instill the belief in God Almighty based on His creation's existence, beauty, and orderliness (Depdiknas, 2008). The implementation of integrative science learning can answer this. Fourth, KEPDIRJEN Islamic Education No. 102 of 2019 concerning PTKI religious standards stipulates lecturers' religious standards, which are the minimum reference for lecturers' competence and basic abilities in integrating Islamic values into the curriculum. These religious standards include noble character, basic Islamic skills (reading and writing the Qur'an, worship), Arabic and English language skills, the ability to integrate Islamic values with the field of knowledge possessed. In addition, lecturers must have solid national insight in practicing moderate Islam within the framework of the Unitary State of the Republic of Indonesia (Ministry of Religion of the Republic of Indonesia, 2019). In implementing the curriculum, lecturers are required to integrate the material being taught with Islamic values.

Lecturers as curriculum implementers are responsible for achieving the visions and missions of Sharia-based Acehnese education. Teachers must have competencies to integrate the pedagogic, professional, and social competencies (Bisschoff & Grobler, 1998; Fauzi & Nurlaila, 2017; Yusnita et al., 2018). Yusnaeni et al (2017) found that the learning strategy used by teachers was instrumental in generating students' motivation and thinking awareness that would affect students' thinking ability and learning results. In addition, lecturers are also required to realize the integration of Islamic values in learning. Moreover, SNPT mandates that the implementation of learning must develop intellectual intelligence, noble character, skills, creative thinking, collaboration, elaboration, and communication (Bidin et al., 2020; Nurdin, 2021; Vebrianto, Rus, et al., 2020; Yusnita et al., 2018). By implementing integrative science learning accompanied by the ability of lecturers in its application, universities will be able to produce super outputs in the development of the integration of Islamic values in science (Nurdin, 2021; Vebrianto, Jannah, et al., 2020; Yusnita et al., 2018). Thus, universities will give birth to multidisciplinary scientists with Islamic law in society.

A myriad of studies has been conducted on the integration of Islamic values into sciences. Purwati et al. (2018), for instance, found that science learning integrated with Islamic values yielded significant effects on the students' learning. A study conducted by Fauzan (2017) revealed that the integration of Islam and science in the curriculum is still limited to using several Islamic and science courses separately. Such as Islamic Studies, Islam and Science, Fiqh, Basic Mathematics. The atmosphere of the integration of Islam and science can be seen in the tradition of student clothing, lecture activities that require all lecturers and students to recite the Qur'an at the beginning of the lecture. Ar (2017) focused on integrating an integrated curriculum between science and religion. The study concluded that integrating the integrated curriculum has been running gradually through the courses taught at PTKINs, such as through the one-day one-verse of Quran program, there are courses in Islamic Shari'a Studies, Islamic Study Methodology, Kalam Science, and Introduction to Islamic Science. However, some studies are still on structuring the concept of integration and model design. Few studies lead directly to integrating Islamic values in the implementation of learning. The

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ability of lecturers to integrate Islamic values in science learning is an essential competency.

Despite these studies, however, to the best of our knowledge, whether the lecturers of PTKINs in Aceh have the ability to apply it has been unknown. The competence of good educators will affect the positive character of graduates (Sarwi, 2018). This study was therefore carried out to fill in the void. This study focused on the ability of science lecturers to integrate Islamic values into the science curriculum at PTKINs in Aceh. This paper contributes to the conceptual framework for integrating Islamic values in the science curriculum of PTKIN in Aceh.

Between Expected and Implemented Curriculum

To understand the implementation of a curriculum, it is useful to align with the curriculum based on its levels of representations. In this regard, Goodlad (1979) and Akker (2004) have developed the six levels of curriculum representtions as can be seen in Table 1 below.

Table 2. Curriculum Representations

	Levels	Representations
INTENDED	Ideal	Vision (rationale or basic philosophy underlying a curriculum)
	Formal/Written	The written curriculum documents
		and/or materials
IMPLEMENTED	Perceived	Curriculum as perceived by its users (e.g., teachers)
	Operational	Actual process of the curriculum in teaching and learning
ATTAINED	Experiential	Curriculum as experienced by students
	Learned	Resulting learning outcomes of students

Source: Thijs and Akker, (2009)

Table 1 shows the six levels of curriculum representations, ranging from ideal, formal, perceived, operational, experiential, and learned levels. From Table 1, it can be understood that the integration of Islamic values into sciences which in turn improve students learning at the attained level, needs to have good perceptions of the implementers. In this context, the academics' perceptions of the intergrated sciences with Islamic values and the ways they operate in their classrooms need to be considered.

METHOD

This study used a qualitative descriptive approach to identify and describe the characteristics of the science lecturers who worked for the PTKINs in Aceh in integrating

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Islamic values into the curriculum. This research was conducted at three PTKINs in Aceh, namely (in pseudonyms) West Islamic College, East Islamic College, and North Islamic College. This study used interviews with three deputy deans for academic affairs, nine science-based courses' lecturers, and 12 students majoring in Sciences. Meanwhile, the document analyzed were curriculum, Rencana Pembelajaran Semester (RPS) or semesterly syllabuses, and academic manuals. Furthermore, we observed the classroom process held by ten science-based course lecturers.

The research data were obtained from structured interviews, document analysis, and classroom observations. In addition, data were also obtained through FGDs with several lecturers and students whose answers, responses, and responses could represent the entire resource person. Triangulation was carried out from all data and summarized the data according to the research problem by eliminating unnecessary data.

The interviews were recorded and transcribed by classifying the information according to the research objectives. The analysis was carried out in the following stages: data reduction, presentation, verification, and drawing conclusions (Miles & Huberman, 1992). During the data reduction, all the unnecessary information was removed. The data from document analysis, classroom observations, and FGD were analyzed by coding, find the themes and categorized

RESULT AND DISCUSSION

Expectations of the Integrated Islamic Values and Science

Integrating the science curriculum of PTKINs in Aceh is expected to build the characters of students and lecturers based on moral values and Islamic spirituality. Science in the context of Islam makes the Qur'an and Sunnah scientific realities and theoretical foundations. The inculcation of Islamic values is a process with a paradigm and a worldview (Khoirudin, 2017; Kuntowijoyo, 2006; Purwanto, 2015; Taufiqurrahman et al., 2021; Zarkasih et al., 2020). Meanwhile, Islamic integrative science is a process that makes faith and piety the final process of understanding knowledge. This term is known as returning science from the context of science to the Qur'anic text.

Connecting science with its sources in the methodology of an Islamic perspective must comply with the values of monotheism. According to Bidin et al. (2020), the integration of Islamic values in the implementation of the science curriculum does not only connect with the lecturer's understanding of the verses of the Qur'an, but the integration of Islamic science must be constructed on a conceptual framework and paradigm that is based on Islamic values . So that the science curriculum at PTKINs in Aceh not only changes the name of the courses from general science to science labeled Islam but must be integrated into the ontological, epistemological, and axiological sciences themselves. This is important to provide a comprehensive understanding of intellectual perspectives and mindsets, students, and lecturers in understanding the concept of science integration. It is free from the understanding of Western intellectual culture, which relies on material and ratios but denies basic truths (the truth of monotheism).

The competence of the lecturers largely determines the success of the integration of Islamic values in the PTKIN curriculum. Every lecturer who teaches science courses at PTKIN needs to be competent and must be equipped with a deep understanding of the field of Islam, especially the competence of lecturers in integrating Islamic values in each learning objective science learning materials and

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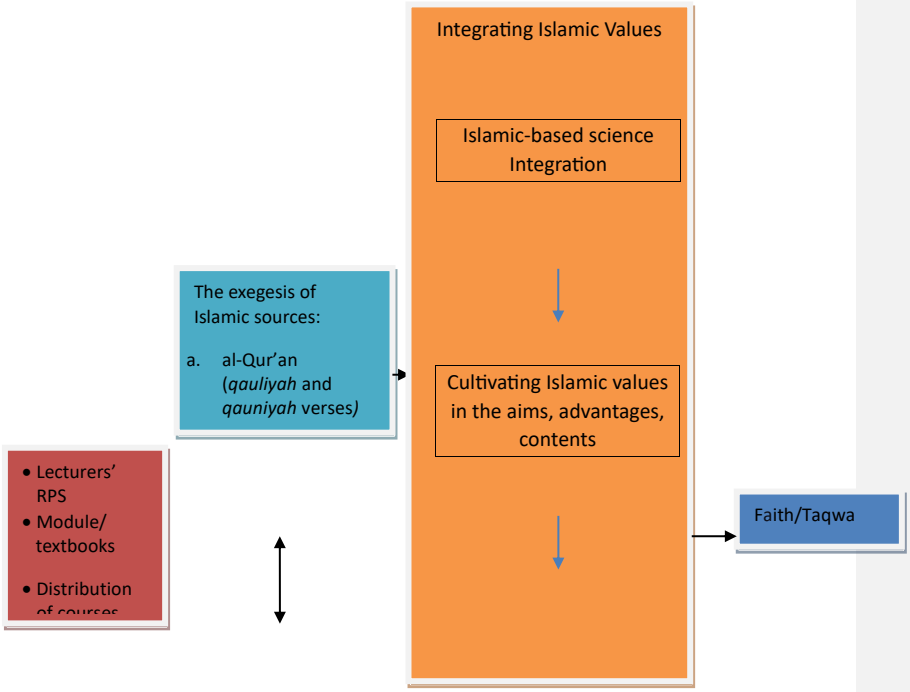
1. The results are an explanation of research findings that are more obtained in the field in the form of interviews, observations, document studies, FGDs and others
The discussion places more emphasis on the results found that are synchronized with existing theories or previous studies.
2. results are synchronized answers to research questions posed at the beginning

3. The results and discussions need deep changes

evaluation. Learning Science lecturers must integrate Islamic-based science learning in every lecture material and prepared curriculum. In addition, lecturers must become role models (Baran et al., 2019), especially in shaping the character of pious students, who have noble characters in shaping human resources with Indonesian character, which is the ultimate goal of internalization in the PTKIN curriculum (Ratnawati, 2018).

Integrating Islamic values into the science curriculum can be done by integrating sharia, creed, and moral values . This is done to make science a means of proving the greatness of Allah SWT (Adawiah, 2016; Munadi, 2016). As such, studying science will add piety and faith as formulated in the nature of science learning and the goals of national education summarized in the IQF curriculum. The process of integrating Islamic values into the PTKIN curriculum can be seen in Figure 1 below.



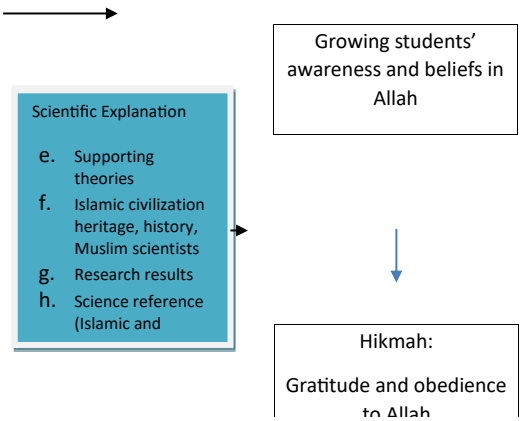


Figure 1. The conceptual framework of Integration of Islamic values

In implementing the science curriculum of PTKIN Aceh, every lecturer must instill Islamic values related to the objectives, benefits, and content of the material. Murdiono (2010) revealed that the strategy for internalizing religious values (in this case, Islamic values) in learning includes exemplary, actual problems in society, inculcating contextually educative values, and strengthening moral values. Designing Islamic values related to scientific material that fosters awareness and belief in Allah SWT's greatness will foster gratitude and increase obedience in worship, which will increase piety to Allah SWT, which is the goal in learning science (Alattas, 2001; Kuhn, 1962; Purwanto, 2015; Shihab, 2007).

In essence, science is built on scientific products, scientific processes, and scientific attitudes. Muhaimin (2001) states that science (science) is human knowledge about the physical world and its phenomena. Science is tasked with discovering the relationship of principles, qualities, characteristics in humans, nature, and other entities. Every science learning must be based on the scientific method, so that it requires the internalization of religious values in cultivating a scientific code of ethics that provides direction and motivation for the scientific product itself. The internalization of religious values will direct the use of useful scientific products for the benefit of humankind instead of producing products that destroy generations and divide peace and humankind.

Trianto (2010) explains the nature and objectives of science learning: the first essence, namely, awareness of the beauty and orderliness of nature to increase belief in God Almighty. Second is knowledge, namely knowledge of the basic principles and concepts, facts in nature, interdependence relationships, and the relationship between science and technology. Third, skills and abilities to handle equipment, solve problems and observe. Fourth, scientific attitude, including skepticism, critical, sensitive, objective, honest, open, correct, and working together. Fifth, the habit of developing inductive and deductive analytical thinking skills by using scientific concepts and principles to explain various natural events. Sixth, appreciating science by enjoying and realizing the beauty of the regularity of natural behavior and its application in technology. Lecturers as curriculum implementers must integrate Islamic values with students in every science material. Students are taught a critical and comprehensive mindset towards science in understanding Western theoretical views combined with Islamic values in each material (Adawiah, 2016).

Integrating Islamic values in the implementation of the Aceh PTKIN curriculum is strongly influenced by the competence, mindset, enthusiasm, and willingness of the Aceh PTKIN science lecturers to reconstruct the general science curriculum into a curriculum integrated with Islamic values. In addition to the competence of lecturers, which significantly influences the success of implementing this curriculum, is the willingness of the lecturers to explore and study science sources through Islamic sources, Islamic civilization, history, as well as research results and theories of Muslim scientists in the

sub-materials of science being taught. The following are the findings in a study on the ability of lecturers to integrate Islamic values in the implementation of the science curriculum of PTKIN Aceh.

The Implementation of the Integrated Islamic Values and Science

The observations of the classroom teaching held by Science lecturers of the PTKINs in Aceh showed several important findings. First, some lecturers had integrated Islamic values in the early stages of learning in the classroom by reading prayers and *tadarus* of the Quran related to the material, and even then, a small number of lecturers studied did the integration of Islamic values in the opening of learning. In reading the verses of the Quran, the verses that are read have not touched the realm of the material being taught, *tadarus* of the Quran are short verses (juz 30). Most lecturers asked students to go directly to the main learning material by asking for group discussions without opening the lesson. It indicates that the integration of Islamic values into the lesson material has not been implemented as intended at the opening stage.

Some lecturers integrated Islamic values at the learning material stage by mentioning verses of the Quran and interpreting verses based on Muslim scientists' material, concepts, and roles and combining them with modern scientific theories in the lesson material being taught. However, some lecturers did not integrate Islamic values into the material. Lecturers directly deliver pure science material without doing integration. The RPS analysis revealed that some of the lecturers previously included the integration of Islam in learning outcomes, but in the implementation of learning in the classroom, they did not integrate. Some of the other lecturers have not integrated Islamic values in their RPS, but in the implementation, the lecturers have linked the integration, although not entirely. Obviously, some lecturers did not teach according to the RPS. Some do it in the initial activities, but the core activities do not integrate. Integration is carried out again in the closing activity in the delivery of reinforcement.

During the interviews, one of the students said:

> *Integrating Islamic values in science learning has not been carried out properly at every face-to-face meeting. Integration is only done in a few meetings, and some do not integrate at every meeting. According to them, the integration carried out by several science lecturers has not touched the material realm, but the integration is carried out only on reading the verses of the Koran at the beginning of learning and directly on the delivery of pure science material. Some lecturers integrate at the final stage by linking science with Islamic values but not at every meeting. Strengthening integration was at the final stage of learning if time was available. Most of the lecturers only teach pure science material at each meeting.*

The excerpt reveals that some lecturers did not integrate Islamic values to organize the curriculum being taught. Most of the lecturers do not have the ability in a structured way to integrate Islamic values into the science curriculum of PTKIN Aceh. It was obvious that in the analysis of curriculum documents, the integration of monotheism values has not been seen in curriculum planning; integration was only on materials that they could integrate, some other lecturers do not integrate at all. The lecturers lacked the

ability and desire to find and interpret the verses of the Quran, the reluctance to combine modern scientific theories with Islamic theories, associate and instill values in the material based on the results of Muslim and Western scientific research.

There was lesson material that can be directly traced in the Quran, and there is material challenging to trace by the lecturers because the explanations in the Quran are general, so the integration process was only at the beginning and end of the meeting. According to them, imposing integration on material because it has not been able to find a source in the Qur'an will result in misinterpretation and misunderstanding of the interpretation of the Quranic verses. Errors in the interpretation of the verses of the Koran will be fatal in instilling Islamic values in learning. This difficulty is due to the absence of complete textbooks and reference materials on science material on integrating Islamic values.

According to them, not all science learning materials can be integrated thoroughly into the learning process at the initial, core, and final stages because they are directly related to Islamic values or Islamic sources. However, there is scientific material that is not yet known to be related to Islamic values, so the integration process can only be carried out in the early and final stages of learning, and its strengthening was emphasized on the wisdom of the material. So it did not have to force all science material to be integrated thoroughly in all learning materials.

In addition, durng the interview, one of the students stated:

> *Implementation of the integration will be successful depending on the ability of lecturers to apply learning methods. Students can absorb integration material depending on the delivery of the material taught by the lecturer through the learning method. According to them, the learning system of some science lecturers still uses the lecture method with a one-way and monotonous transfer of knowledge. Students in the interaction process in class only listen to the lecturer deliver the material from start to finish. Although all lecturers understand active and integrative learning methods, in practice, the lecturers use the unidirectional lecture method and dominate the delivery of material so that the lecture atmosphere tends to be boring.*

Findings indicated that most lecturers who have not implemented the integrated curriculum were graduates majoring in pure science from public universities. The concept of integrating Islamic values in the science curriculum was still new. They have not been equipped with the concept of Islamic science, especially the ability to search for verses from the Qur'an and other Islamic sources explicitly or implicitly to the material to teach. Based on the results of the interviews, there was no provision of knowledge about the interpretation of the Qur'an and other sources of religious education related to science when they became scholars because they were equipped with general scientific knowledge (Muspiroh, 2013; Qissa 'Ali, 2018)..

However, not all pure science lecturers (of public university graduates) have not implemented the concept of integration in the curriculum. Some of them can do it well. The lecturers had tried to integrate Islamic values and relate them to the lecture material. So it can be concluded that apart from the

graduate factor, the integration of Islamic values in the science curriculum was also influenced by the lecturer's internal factors such as the lecturer's ability to understand Islamic sciences, obedience, and the values of the lecturer's piety foundation (Ibrahim et al., 2017).

On the other hand, lecturers who graduated from PTKIN did not integrate it into the curriculum. In fact, in the interview, he seemed to have understood the concept of integration well. Unfortunately, the design of the RPS and the implementation of the curriculum have not integrated it at all. Therefore, the integration of Islamic values in the implementation of the curriculum of the PTKIN in Aceh was strongly influenced by the willingness and interest of the lecturer. Some lecturers lack the willingness and desire to integrate Islamic values into the curriculum. Based on the results of the research, the implementation of integration in the science curriculum of PTKINs in Aceh is strongly influenced by individual factors of lecturers. The ability of lecturers to integrate Islamic values into the science curriculum will affect the formation of students' religious attitudes (Damanik, 2019).

The lecturers' lack of awareness is because integrating Islamic values in the Aceh PTKIN curriculum has not led to massive implementation. On the one hand, PTKIN Aceh applies Islamic integration in its vision and mission as a manifestation of the implementation of Islamic Sharia in education (Zulfata, 2017). On the other hand, there are no standardized guidelines and standards for every lecturer, student, and employee regarding how integration should be implemented. So it can be seen that the implementation of integration in the science curriculum of PTKINs in Aceh tends to be modest, even though it should have become an academic culture at Islamic religious colleges (Multazam, 2019). The awareness of some lecturers still constrains the integration of Islamic values in the science curriculum in Aceh. Because there are no manuals, standard rules, and the lack of awareness of the lecturers, the integration of Islamic values in the science curriculum of PTKIN Aceh has not been achieved and has not been implemented perfectly.

Based on the analyses of documents and interviews with the deputy deans for academic affairs at three PTKIN Aceh, the integration of Islamic values became the main foundation in the vision and mission of PTKIN Aceh. However, in the implementation process in the field, there were no written standard rules that become SOPs. These rules were only conveyed orally through meetings in the discussion of the PTKIN science curriculum. The absence of these standard rules can allow for various interpretations, the burden of responsibility, and the seriousness of each science lecturer in implementing the integrated Islamic values in the curriculum. There are no rules that bind the extent to which the integration of Islamic values, the inculcation of spiritual values, and the value of diversity must be applied in the science curriculum so that PTKIN's vision and mission can be implemented (Compiler, 2018). The written regulations are crucial things to prepare by lecturers, so curriculum planning is right on target (Directorate General of Learning and Student Affairs, 2016; Kristiawan, 2019) . In addition, the integration model developed is still a formality, and the labeling of sharia has not led to the factual component of a holistic implementation.

This is proven based on interviews with lecturers that revealed that some lecturers gave various answers about the concept and paradigm of integrating Islamic values in the PTKIN Aceh curriculum. The lecturers only understand the term integration-interconnection in different meanings and knowledge. The limitations of the integration of Islamic values in the strengthening of science material, and how that integration is

carried out without changing the science curriculum itself and material achievements can be carried out by lecturers without adding additional lecture time.

One of the lecturers said:

> *There is no dichotomy in Islamic science, so there is no need for integration in the curriculum. PTKIN Aceh has religion courses and general courses. So that when the preparation and development of the curriculum do not need to be integrated with Islamic values. Islamic values have been constructed in religious subjects. Reference sources and materials can be used as references to Western science without looking for integrative reference sources because they do not yet exist. Regarding the cultivation of Islamic values, students and lecturers can filter secular Western values and dogmas through religious courses. Let the religious courses and general courses stand-alone without integration.*

It indicates that the lecturers have not comprehensively understood the applied integration paradigm model. This is due to the lack of socialization of the integration model applied to each PTKIN Aceh. Thus, a leadership role is needed in the socialization of the integration because there is a significant influence on improving the competence of lecturers (Rahayu & Hutabarat, 2019). The implementation of the integration of Islamic values at PTKIN Aceh still focused on curriculum development, whereas the development of lecturers' abilities both in integrating the lecturer's worldview and in implementing the integrated science curriculum has not been carried out. The integration of Islamic values in the PTKIN Aceh curriculum seems to be completely left to the wishes and desires of the lecturers. Curriculum evaluation has not led to the implementation of integration. So it can be concluded that the implementation of the integration of Islamic values in the Aceh PTKIN curriculum has not fully led to the realization of the vision and mission of the Aceh PTKIN institution.

CONCLUSION

This study has investigated the implementation of an integrated curriculum of Islamic values and science at three PTKINs in Aceh. It demonstrated that the intended curriculum had not been implemented as expected. The lecturers have not comprehensively understood the integration model applied to each PTKIN. It is due to the absence of the standard, SOP, and integration guidebooks at each PTKIN in Aceh and the integration model's lack of socialization applied to each PTKIN in Aceh. Socialization is only delivered orally in curriculum planning meetings. There are differences in the views and responses of lecturers in understanding and interpreting the paradigm of integration of Islamic values in the implementation of learning in the form of boundaries and concepts applied. The implementation of the integration of Islamic values at PTKINs in Aceh was still focused on curriculum development, while the development of lecturers' abilities both in integrating the lecturer's worldview and in implementing the integrated science curriculum is still limited. The integration of Islamic values in the PTKIN Aceh curriculum is completely left to the willingness of the lecturers to implement the curriculum. Besides, curriculum evaluation has not led to the implementation of integration, the limitations of lecturers in finding and

Commented [A39]: 1. the conclusion is too long and tends to repeat what has been explained in the discussion
2. The explanation of conclusions is more about the answers to research questions based on field findings and only 2 or 3 short paragraphs
4. It is necessary to add the limitations of this study and the following recommendations

interpreting Quranic verses, references related to scientific materials. So it can be concluded that the implementation of the integration of Islamic values in the Aceh PTKIN curriculum has not led to the realization of the vision and mission of each Aceh PTKIN institution. It needs regulations and guidebooks on the patterns of integrating Islamic values in learning, research, and community service.

Nevertheless, this study was still limited to a few subjects or has not been carried out comprehensively on PTKINs in Aceh. It has not examined learning resources that integrate Islamic values in science lecturers used in RPS, the problems they encounter, and nd their identity development. Further studies are necessary to do involving lecturers teaching each of the courses at PTKINs so that generalization can be made.

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Dear Authors.

We would like to inform you that; based on the review on the following article:

Title : Mapping TPACK Components in the Implementation of Edupreneur-Profiled Curriculum at Teacher Training and Education Institutions in Aceh
Authors : Lailatussaadah, Salma Hayati, Asyraf Isyraqi Bin Jamil, Fakhrul Adabi Bin Abdul Kadir
First Authors' Institution : Universitas Islam Negeri Ar-Raniry Banda Aceh, Indonesia

We declare that the article **is accepted** and will be published in journal **Tadris: Jurnal Keguruan dan Ilmu Tarbiyah** for **December 2023 issue (Vol. 8 No. 2).**

Thus this letter of acceptance is issued to be used properly. We thank you for your attention.

Bandar Lampung, October 3rd, 2023
Editor in Chief,

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