

DOCUMENT OF CORRESPONDING

Title : Development of smart digital interactive service as a strategy for guidance and counseling services in higher education

Author(s) : Dina Hajja Ristianti, Wandi Syahindra, Jumansyah, Marlena, Mohamad Aziz Shah Bin Mohamed Arip

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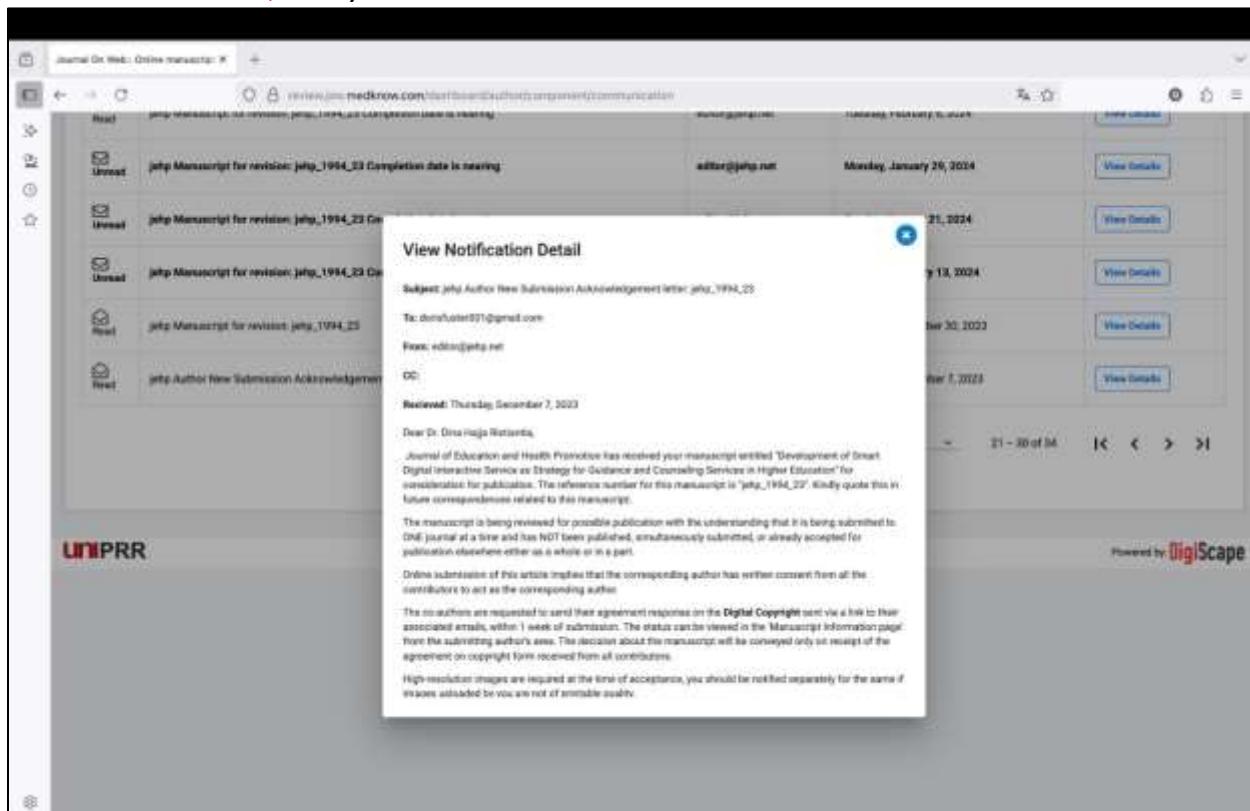
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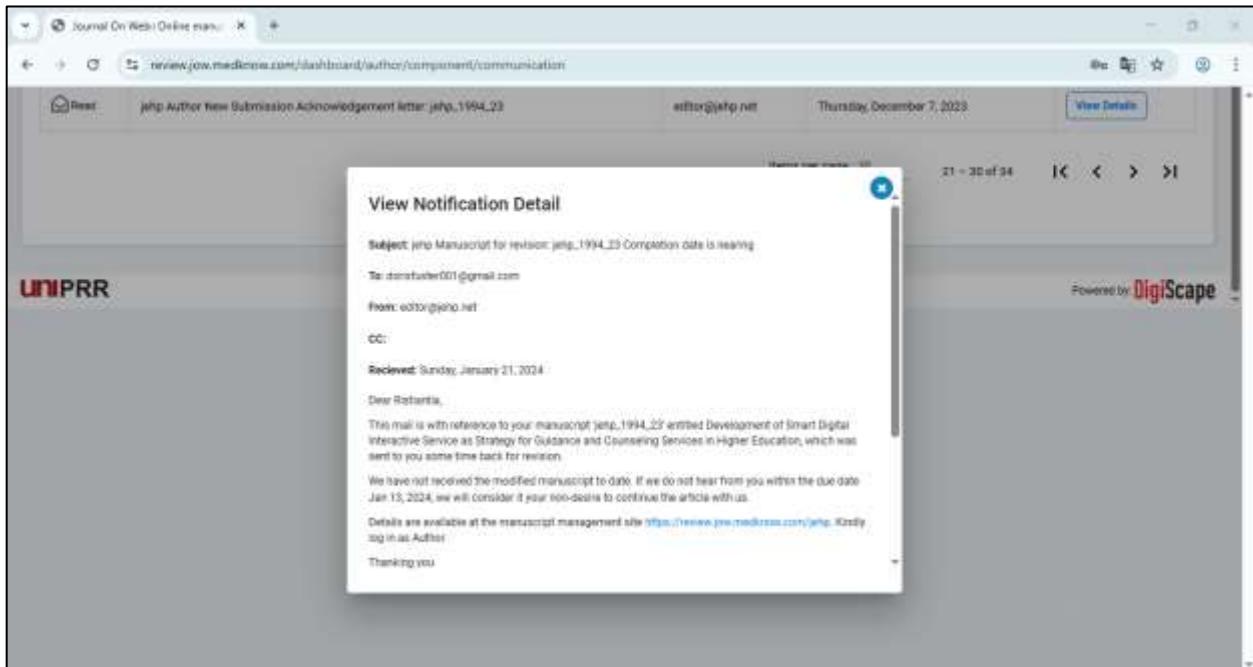
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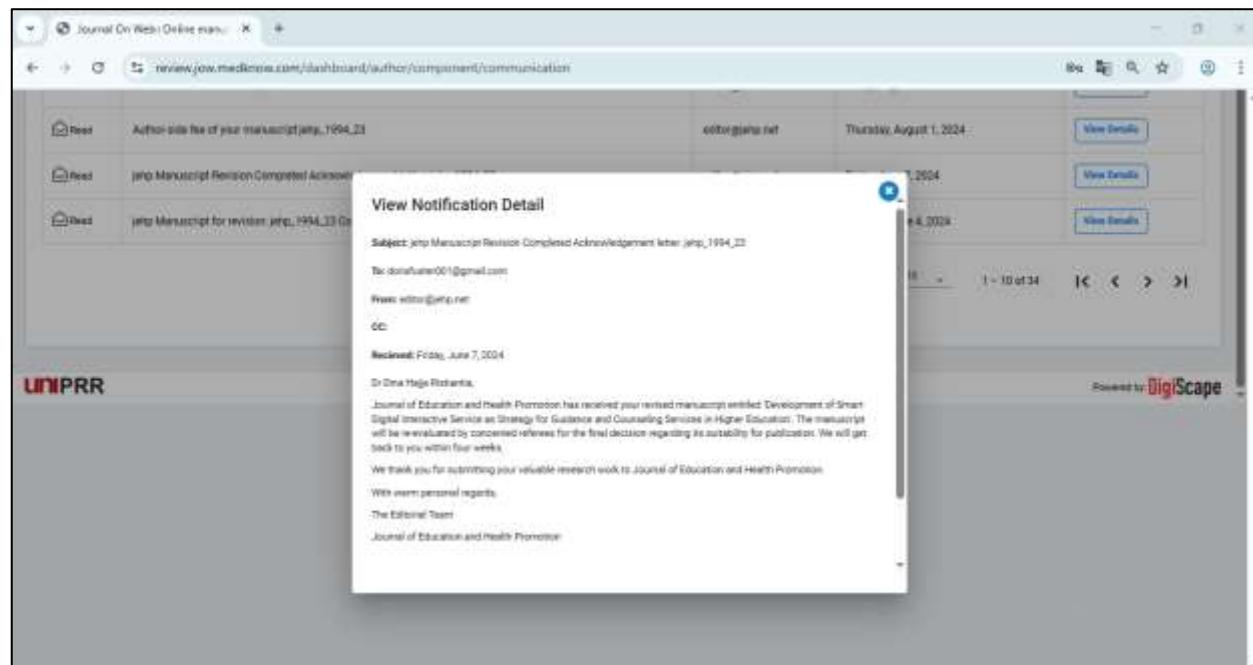
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<RH>Ristianti, *et al.*: Guidance and counseling services in higher education

Brief Report

Development of smart digital interactive service as a strategy for guidance and counseling services in higher education

**Dina H. Ristianti, Wandi Syahindra¹, Jumansyah², Murlena³, Mohamad Aziz Shah Bin
Mohamed Arif⁴ A. S. B. M. Arif⁴**

Department of Islamic Education Guidance and Counseling, Institut Agama Islam Negeri Curup, Rejang Lebong, Indonesia, ¹Department of Islamic Religious Education, Institut Agama Islam Negeri Curup, Rejang Lebong, Indonesia, ²Department of Information Systems, Universitas Islam Negeri Raden Fatah Palembang, Palembang, Indonesia, ³Department of Computer Science, Universitas Pat Petulai, Rejang Lebong, Indonesia, ⁴Department of Psychology and Counseling, Universiti Pendidikan Sultan Idris, Tanjung Malim, Malaysia

Address for correspondence: Dr. Dina Hajja Ristianti,

Department of Islamic Education Guidance and Counseling, Institut Agama Islam Negeri Curup, Rejang Lebong, Indonesia.

E-mail: dorisfuster001@gmail.com

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Abstract

Background: The digitalization of guidance and counseling services are easy to access and effective in higher education. This study aims to develop Smart Digital Interactive Service as a strategy for Guidance and Counseling services in Higher Education.

Materials and Methods: This study is a form of Research and Development (R&D) research that employs the Waterfall Approach Model, which consists of four primary phases: planning, analysis, design, and implementation. Research subjects were selected by purposive sampling, where subjects were selected based on specific objectives.

Smart Digital Interactive Service products are assessed by four people: information technology experts and guidance and counseling experts and content experts.

Results: The effectiveness of the product was evaluated by 15 students on a limited scale, and then by 30 students on a larger scale. Using questionnaires, researchers gathered information on the effectiveness of Smart Digital Interactive Service products as Guidance and Counseling service strategies in universities. The scores were assessed in percentages and grouped based on the "eligible" category. The outcomes demonstrated that the Smart Digital Interactive Service development is "highly practicable." The evaluation is based on the advantages, functions, communication, material content, language, and communication.

Conclusion: This study demonstrates that Smart Digital Interactive Service is “feasible” for use in Higher higher Education-education as a strategy for guidance and counseling service delivery.

Keywords: Guidance and counseling, higher education, smart digital interactive service

<H1>Introduction

The global COVID-19^[57] COVID-19 pandemic has accelerated digital transformation significantly.^[1-3] Almost all human activities utilize digital technology, notably communication, due to social restrictions to maintain health protocols.^[4-6] In education, the percentage of digital technology used by the population aged 5—24 years in-for communicating is increasing.^[7] This digital use is consistent with the concept of the Industrial Revolution 4.0, in which digitalization is linked to the internet.^[8] This digital transformation requires universities to accelerate the transformation of the education system towards digitalization^[2,9] Today's rapidly growing digital transformation requires universities to innovate to survive and compete consistently.^[10,11] Higher education institutions must integrate all learning services and activities using digital technology.^[5,12,13]

Guidance and counseling services, as an essential part of a university, are required to continue to innovate in providing services to students.^[14-16] Cyber counseling^[17-21] or internet counseling^[22,23] or online counseling^[24,25] are already prevalent in guidance and counseling services. The purpose of digitizing counseling services is to make them more accessible or practicable due to the fact that they are independent of location and time.^[26] The digitization of counseling services is one solution for counseling services that are limited by the lack of counseling opportunities (clients) to visit counselors due to the distance and relatively excellent location of counselors^[23,27] They are a solution due to clients' anxiety when meeting directly with counselors, a solution for counselors who do not have the opportunity to meet

directly with clients, and a solution due to the pandemic's limitations.^[28-30]

One of the studies conducted by M. G. Shahamabadi, *et al.*^[31] during the CovidCOVID-19 pandemic at Imam Jafar Sadegh Hospital in Meybod, Iran, where a study was conducted on 80 women with a history of miscarriage by providing online counseling to them. The results of the study showed that online counseling was effective in reducing the level of anxiety felt by women after miscarriage. In addition, the research conducted by Amini N et all.

Ramezankhani, et al. who examined 184 health workers and 184 clients at the Health Center from-at TUMS (Tahenran University of Medical Sciences) from January 20 to May 21, 2021 by providing online training and counseling to them. The results of the study show that online counseling on a healthy lifestyle in primary health services can control the risk factors of Nonnon-Communicable-communicable Diseases-diseases for clients and improve online counseling skills for health workers.^[32] One form of digitizing services to-for students in higher education is the use of online-based Acceptance and Commitment Therapy (e-ACT) in Malaysia. The study examined the effectiveness of e-ACT on psychological flexibility and mental well-being assessed among 52 Malaysian undergraduate students aged between 18 and 23 years during the pandemic. Participants received two online e-ACT sessions (a total of 5 hours). The results showed that there was a significant increase in mindfulness, psychological flexibility, and well-being among students.^[33]

Digitalization The digitalization of guidance and counseling services in higher education is an effective and efficient means of establishing communication between counselors and service subjects (clients), where counseling or services are typically only provided in the form of relationships within a face-to-face to-digital academic framework.^[13,34-37] However, communication relationships that are framed academically and Guidancee-guidance and Counseling-counseling service are usually done through social media, Facebook, Instant Messenger (IM), or Ee-mail.^[26] This is unfortunate because online counseling is not made

programmatically or deliberately, so the activities of guidance and counseling services are limited to ordinary “online vents” without being framed by the professional ethics of guidance and counseling.

The Guidance-guidance and Counseling-counseling service program component in-of higher education includes essential services, responsive services, individualized planning, and system support.^[38,39] Essential services can be done through classical and group strategies by providing orientation and information services programmatically. Responsive services are conducted through individual and group counseling strategies, consultation, handover, and peer guidance. Personal planning services are carried out through individual and group assessment strategies, advisory, placement, and distribution. System support is done through professional development strategies and collaboration. The many types of digitally integrated Guidance-guidance and Counseling-counseling service development have not met all components of universities’ Guidance-guidance and Counseling-counseling service programs and Guidance-guidance and Counseling-counseling service strategy. The digitally integrated Guidance-guidance and Counseling-counseling service is only limited to individual counseling services that respond to students’ needs to escape their problems.

The readiness of guidance and counseling services to take advantage of purposefully created or programmed digital technology is required so that students from generations who are very familiar with digitalization^[40,41] can make the most of guidance and counseling services.^[42] Digitalized guidance and counseling services are a medium specifically designed to meet the needs of psychological consultation services for students in higher education, provide convenience for students to access services while remaining framed in the professional ethics of guidance and counseling, and offer counselors comfort in archiving data and storing all service records.^[26] Digital Guidance-guidance and Counseling-counseling services allow students and counselors to communicate asynchronously via chat or email. At any time,

students want to ask questions or share their concerns, and counselors can respond. This increases communication flexibility and allows for more frequent interactions.^[43]

The process of accrediting higher education institutions includes counseling services.

Criterion 3 of the Student Policy:^[44] addresses counseling services. IAIN Curup, one of the institutions in Bengkulu province, has a guidance and counseling service unit that offers counseling, academic, and development services. This counseling service still employs a conventional system or requires direct meetings with a counselor, resulting in numerous obstacles and challenges.

In conventional counseling services, numerous obstacles exist. There are currently no optimally digitally integrated Counseling counseling and Guidance-guidance services. It is necessary to develop Guidance-guidance and Counseling counseling services that students of the millennial generation can readily access and that meet all components of university Guidance-guidance and Counseling counseling programs and service strategies. In this study, a digitally integrated Guidance-guidance and Counseling counseling service strategy will be developed with the title “Smart Digital Interactive Service as a Guidance and Counseling Service Strategy for the Millennial Generation in Higher Education.” This study is expected to produce a significant finding that can be implemented as a counseling and guidance service strategy in universities today.

<H1>Material and Methods

<H2>Study design and setting

This research develops Smart Digital Interactive Service with the Hannafin and Pack approach model which consists of 3-(three) phases, namely the needs assessment phase, the design phase, and the development and implementation phase. In the first phase, the researcher identified the needs of students for digital-based counseling services so that the development of Smart Digital Interactive Service is needed. In the second phase, the

researcher prepares a flowchart of program stages and media content in Smart Digital Interactive Service. The third stage of the development of Smart Digital Interactive was tested on experts and then tested on small groups and large groups of student respondents at the State Islamic Institute (IAIN) Curup, Bengkulu Province, which started from July 8, 2022, to October 28, 2022.

<H2>Study participants and sampling

The first phase is the phase of identifying student needs for Guidance-guidance and Counseling-counseling services in Higher Education. IAIN Curup has 24 study programs consisting of S1, S2, and S3, with the number of active students for the odd semester period of 2022/2023 is 4674 people. For the large number of students, of course, the conventional offline services at the Guidance and Counseling Service Laboratory are not effective where the available counselors are only 6-six people. Therefore, it is important to have digital-based Guidance-guidance and Counseling-counseling services that can be accessed online so that Guidance-guidance and Counseling-counseling services in higher education can be provided equally to all students. The design phase is based on the-an analysis of the needs of Guidance-guidance and Counseling-counseling services in universities. The system description is designed using process modeling, which functions to determine the user, system input, process, and output generated by the system so that the designed system can run according to the direction and flow of the system using a context diagram. After the development of the menu bar on the Smart Digital Interactive Service product, the Smart Digital Interactive Service product was tested or validated twice by information technology experts and 2-two guidance and counseling experts.

In the second phase, the researcher prepares a flowchart of program stages and media content in-for the Smart Digital Interactive Service. The third stage of Smart Digital Interactive development, which is tested on experts (expert judgement-judgment) is then tested on small

groups and large groups of student respondents to assess the use of Smart Digital Interactive Service.

The next step to see the extent to which the Smart Digital Interactive Service product can be used by students is to be assessed by students as respondents. The assessment by the respondents was carried out in two stages, the first was a small group of 10 students and a large group of 30 students.

<H2>Intervention

To assess the use of IAIN Curup's Smart Digital Interactive Service product, the researcher gave respondents an explanation of how to access IAIN Curup's SmartCounseling account. After that, students register to get a username and password so that students can log in to the Smart Digital Interactive Service IAIN Curup account. Each student has access to online counseling sessions that are arranged periodically for eight weeks via video call or chat with a counselor. They also have access to online discussion forums, where they can interact with their peers and counselors to get social support and share experiences.

<H2>Data collection tools and techniques

In this study, a checklist questionnaire with a Likert scale of 28 items was used. Each questionnaire has three parts: service process, service content, and service communication. In this study, the questionnaire was assessed by 2-two programmers and 3-three guidance and counseling experts. The questionnaire trial was given to 30 students.

<H2>Analysis

Data analysis with Chisquare-chi-square test, one-way, and independent t-variance analysis using SPSS software version 16. Cronbach's Alpha-alpha calculation yielded a value of 0.82, which indicates that the questionnaire has good internal consistency.

<H1>Results

(1) Needs Assessment Phase

The first phase identifies the guidance and counseling requirements of higher education students. IAIN Curup offers 24 degree programs consisting of S1, S2, and S3; the number of active students for the odd semester of 2022/2023 is 4,674 individuals. With only six counselors available, the Guidance and Counseling Service Laboratory's conventional offline services are ineffectual-ineffective for many students. Therefore, the significance of digital Guidance-guidance and Counseling-counseling services that can be accessed online, so that Guidance-guidance and Counseling-counseling services can be provided uniformly to all university students, is highlighted.

(2) Design Phase

The design phase is based on analyzing the need for Guidance-guidance and Counseling-counseling services in higher education. System depiction is designed using process modeling, which determines users, system inputs, processes, and outputs produced by the system so that the system can run according to the direction and flow of the system using context diagrams. The following describes the context diagram of the *smart digital interactive service* system. The design results are shown in Figure 1 below:

In the system process modeling above, depicted in the form of a System-system Context context Diagram, it is known that there is an incoming data flow to be processed by the system, and the system provides output to each entity. The Smart Digital Interactive Service Application System consists of the Smart Digital Interactive Service System Process and several entities, including administrator entities, Teaching-teaching entities, Student student Entities, General-general Entities, and public entities, where all entities are involved in inputting into the Smart Digital Interactive Service system processes. Consequently, each entity will receive the results of The Interactive Service's processing by the Smart Digital system.

The description of the flow of all entities ranging from administrator entities, teaching entities, student entities, general entities, and public entities can be described as follows: a) The Smart Digital Interactive Service system process includes a component that functions as a data processor for requests from entities so that the system process can deliver the intended outputs and regulations for each entity; b) Administrator The administrator entity is an entity with full control over the system, including the ability to submit news, categories, announcements, YouTube video lists, counselor lists, and counselor schedules. This administrator is also responsible for adding user accounts for instructors, general users, and students. Users and passwords are generated by the administrator so that the system can process the user and password sent to the user's email. The administrator helps create basic service categories and responsive services consisting of classical, group, and individual use. This administrator also divides the service section into academic learning services, study skills services, or learning training and career development services. The administrator also functions as a control for grouping participant data that will be included in services that have been planned according to the request of counselors; c) Teaching entities are entities that can upload content in the form of pdfs and YouTube videos, create discussion chats, schedule zoom meetings, and upload materials for classics, groups and counseling for learning services, learning training, and career development; d) Student Entity entity is an entity that can receive services that can be accessed according to the intended service designation, such as learning services, learning training services, and career development services for classical, group, and counseling categories, in addition to more interactive responsive services through zoom meetings; e) The General-general Entity entity is identical to the student entity in that it is an entity that can receive services according to the desired service designation, such as learning services, learning training services, and career development services for classical, group, and counseling categories, as well as more interactive responsive services through zoom Zoom

meetings; and f) Public entities are entities that have access to news, announcements, counselor schedules, educational YouTube videos, and can search for counseling-related topics via the Smart Digital Interactive Service website.

(3) Design and Implementation Phase

Researchers consulted expert developers to set the menu bar on the virtual display. The time it takes is quite long. Errors in programming languages, Html, and coding lead to errors in giving commands. In addition, it is necessary to evaluate several parties to collect input in the form of menu bar work functions, colors, design, content, discussion, and communication before validating based on instruments. The results of development are shown in the following design, Figure 2.

Administrators, [Teachers](#), [Students](#), and [General](#) and [General](#) [Users](#) can log in using the username and password the admin sent in their e-mail. The login menu can be seen in Figure 3 below.

Smart Digital Interactive Service products feature a menu bar that includes [Banners](#), [News](#), [Categories](#), [Announcements](#), [Videos](#), [Counselors](#), [Messages](#), and [Users](#), as well as an application menu bar that includes [Basic Services](#), [Responsive Services](#), and Zoom. The menu bar for the Smart Digital Interactive Service product is shown in Figure 4 below.

After developing a menu bar for the Smart Digital Interactive Service product, experts in information technology and guidance and counseling conducted two tests or validations of the Smart Digital Interactive Service product. The assessment of information technology experts is based on three domains: the use side, the display side, and the function side. Expert assessment of guidance and counseling encompasses three domains: the design aspect, the content aspect, and the communication process aspect. The results of *Smart Digital*

Interactive Service product validation can be seen in the following Table 1.

The results of expert validation revealed that the average score attained by information technology experts was 84.4% and that of guidance and counseling experts was 81.1%. The score falls within the acceptable range. Domain utilization validation by an information technology expert received a score of 82%, the Display domain received a score of 67%, and the Function domain received a score of 70%. The Design domain received a validation score of 82% from guidance and counseling experts, while the Content domain received a validation score of 67% and the Communication domain received a validation score of 79%. From expert validation scores on Smart Digital Interactive Service products, it is possible to conclude that Smart Digital Interactive Service products are “feasible” for use in universities as guidance and counseling services for millennials.

The next step will be to determine how well students can use Smart Digital Interactive Service items. Students serve as respondents in an assessment. There were two stages used to assess the respondents. The first consisted of a small group of ten people and a large group of thirty people. The results of the respondents' assessments are shown in Table 2**below**.

Based on the assessment results of a small group of student respondents (10 persons), the average score received by Smart Digital Interactive Service items is 91.35%, which places them in the very good category. Similarly, the results of the big group evaluation (30 persons) yielded an average score of 89.01%, which falls into the category of very good. Based on the assessment of student responses, it is possible to conclude that the Smart Digital Interactive Service product can be used as a method for delivering guidance and counseling services to the millennial generation in higher education.

<H1>Discussion

Based on the research results of Smart Digital Interactive Service product development, it is strongly advised to adopt Smart Digital Interactive Service products at universities. Students

require supervision and direction to conduct daily activities well and effectively in order to develop optimally and prevent academic problems.^[39,45] They can gain guidance and direction without having to meet with a counselor or enroll in a specific class. This makes it very easy for people to gain access to services that are available instantaneously through digital media.^[1,12,46-49] However, smart digital interactive service is still only a complement to university guidance and counseling activities. Face-to-face service activities must still be carried out.^[50]

Smart digital interactive service products have the following advantages: 1) Save time and money by avoiding requiring students to devote additional time to accessing or receiving guidance and counseling services^[51]; 2) Students have the ability to contact guidance and counseling services at any time and from any location as long as they have an internet connection,^[52] and they can decide when it is suitable to do so; 3) The standardization of services obtained by students is not much different from the standard of services carried out face-to-face.^[47,53] Through this intelligent digital interactive service site, students get the same counseling services as face-to-face counseling services. Students' academic abilities can be improved through services on smart digital interactive service sites, and student problems can also be addressed through smart digital interactive service sites. The activities of guidance and counseling services through intelligent digital interactive service sites follow the mandate of the international counseling service association, which can maintain confidentiality and are easy to use.

The smart digital interactive service product has a “discussion” feature that allows students to form a community of support where they can share experiences, get emotional support, and overcome problems together. The experience and perspective of their friends can help them understand the problem and find a solution. The discussion feature supports multi-directional interaction, where students and counselors can interact with each other and with multiple

teachers at once. This creates an ever-changing environment and where people work together.

Students can undertake projects or group assignments, work together to find solutions, and share helpful resources.^[54]

Previous studies on the benefits of technology in guidance and counseling services are in line with the findings of this study. For example, one of the studies conducted by M.G.

Shahamabadi, *et al.*^[31] during the [CovidCOVID-19](#) pandemic at Imam Jafar Sadegh Hospital in Meybod, Iran where a study was conducted on 80 women with a history of miscarriage by providing them with online counseling. The results of the study showed that online counseling was effective in reducing the level of anxiety felt by women after miscarriage. In addition, a study conducted by Ramezankhani, *et al.* examined 184 health workers and 184 clients at the Puskesmas of TUMS (Tahenran University of Medical Sciences) from January 20 to May 21, 2021 by providing them with online training and counseling. The results of the study show that online counseling for a healthy lifestyle in primary health care can control the risk factors of [Nonnon-Communicable-communicable Diseases-diseases](#) in clients and improve online counseling skills in health workers.^[32]

This research also supports research conducted by [Rahmati](#), which shows that there is an increase in awareness and attitudes towards fertility and fertility counseling skills of health workers, both using face-to-face training methods and through virtual training.^[55] In addition, Eysenbach stated that online communities and support groups can provide significant psychosocial benefits.^[56] It was also found in the study, where students reported the benefits of the group discussion feature, which allowed them to interact in real-time with counselors and peers.

<H2>Limitation and recommendation

In terms of guidance and counseling services in universities, the development and

implementation of smart interactive services has many advantages, namely 1) Scalability where when compared to face-to-face services, digital services are cheaper. This allows more students to receive counselling support, 2) Personalization where interactive technology allows services to be better personalized to meet the unique needs of students, 3) Data Collection where digital platforms make data collection and analysis faster, which makes it easier for counsellors to track student progress and tailor interventions in real-time.

Based on this study, some suggestions for the next research. To increase the generalization of research results, it is necessary to conduct research with a larger and more diverse sample. Long-term research is needed to observe the sustainable impact of digital guidance and counseling services in higher education.

<H1>Conclusion

The Smart Digital Interactive Service product design is geared to the guiding and counseling service strategy of basic, responsive, and system support services. Smart Digital Interactive Service products are created by merging websites and applications, which may be accessed via <http://smartcounseling.iaincurup.ac.id/> <http://smartecounseling.iaincurup.ac.id/> pages. Smart Digital Interactive Service products are accessible to administrators and users, who include counselors, students, and general users.

The data shows that the accessibility of guidance and counseling services through digital platforms is increasing, and the level of student satisfaction with guidance and counseling services is also increasing. Users say that interactive features such as discussion forums, chats, and video calls help them feel more supported and more actively involved in the process of guidance and counseling services.

<H2>Acknowledgments

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<H2>Financial support and sponsorship

Nil.

<H2>Conflicts of interest

There are no conflicts of interest.

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Figure Legends

Figure 1: System context diagram

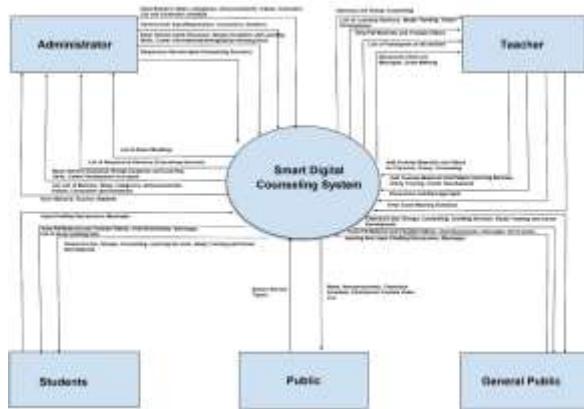


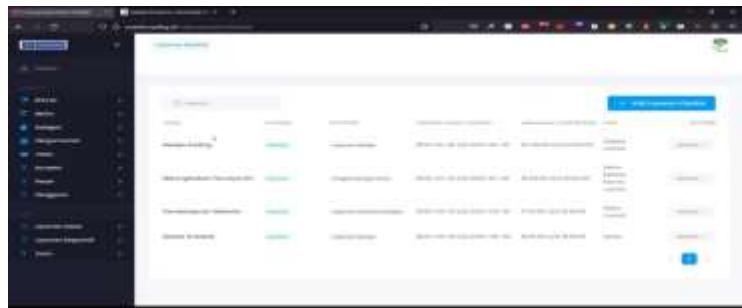
Figure 2: Smart digital interactive service initial display



Figure 3: Login menu on smart digital interactive service



Figure 4: Smart digital interactive service product menu bar



Tables

Table 1: Validation of information technology experts and guidance and counseling experts										
Members	Variable	Total	ST	S	TK	TS	ST	Total	Average	Category
Information Technology Expert (2)	Use	100 (10)	10	63	3	0	0	82%	84.4%	Proper
	Display	80 (8)	15	52	0	0	0	67%		
	Function	80 (8)	30	40	0	0	0	70%		
Guidance and Counseling Expert (2)	Design	100 (10)	5	76	7	0	0	82%	81.5%	Proper
	Accounts	80 (8)	15	52	4	0	0	67%		
	Communication	100 (10)	0	76	3	0	0	79%		

Note: ST = strongly agree, S = agree, TK = no decision, TS = disagree, STS = strongly disagree

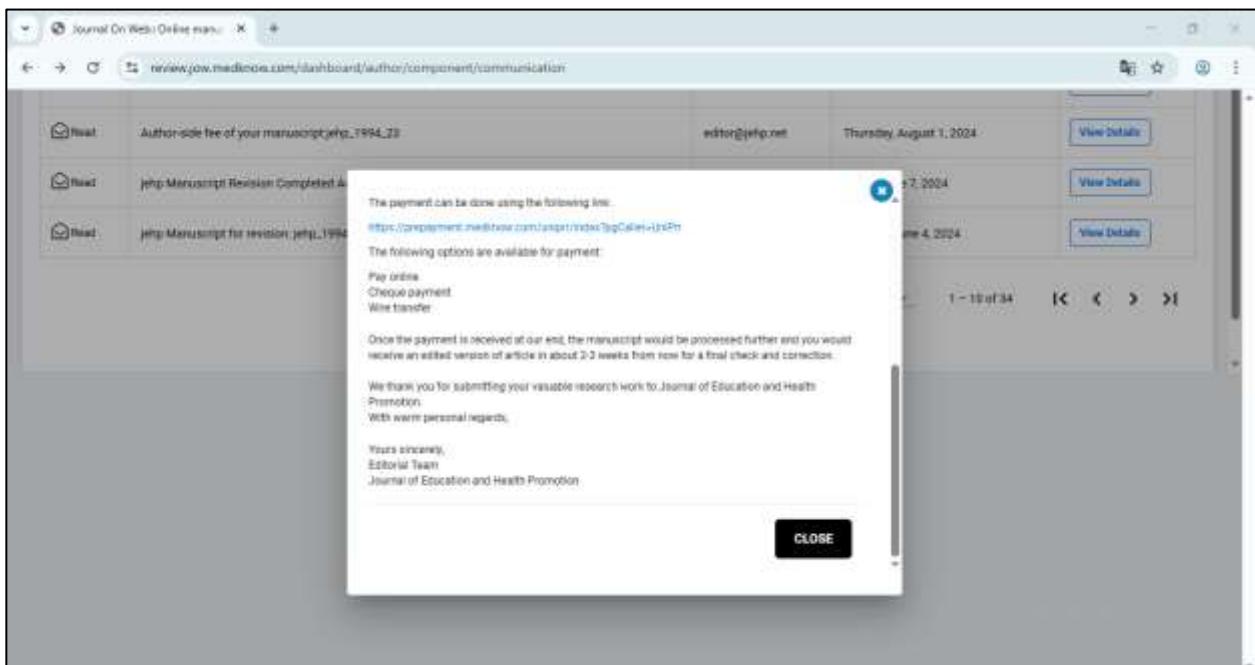
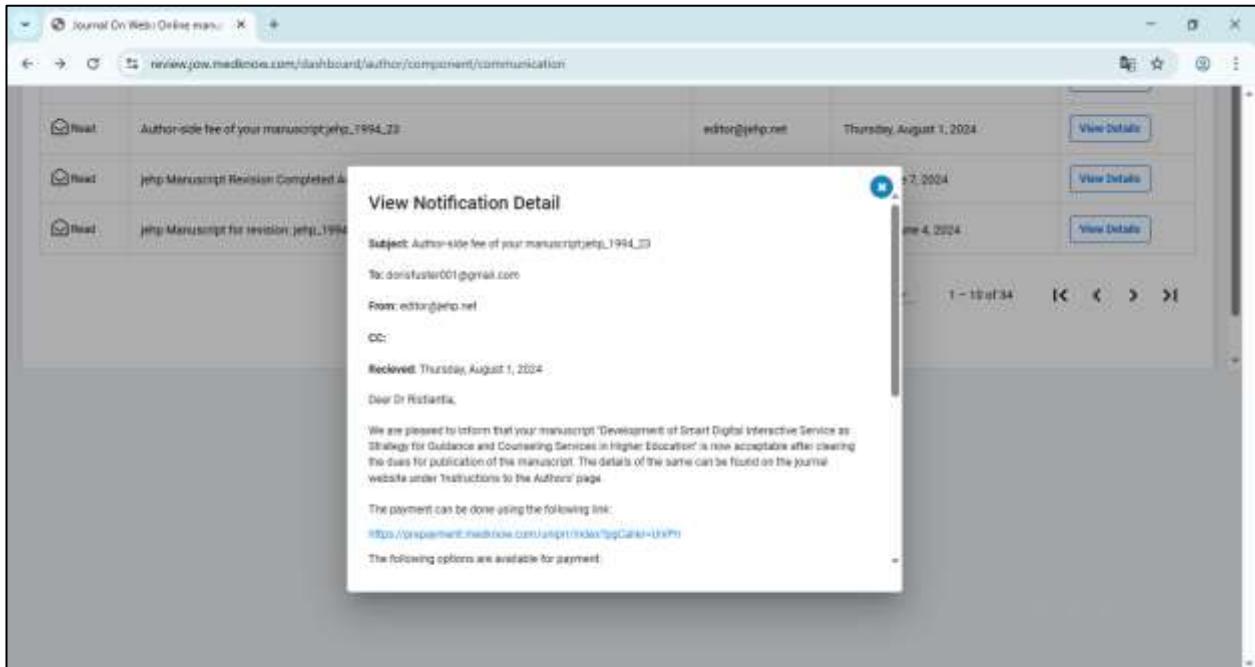
Source: Prepared by the author, (2023)

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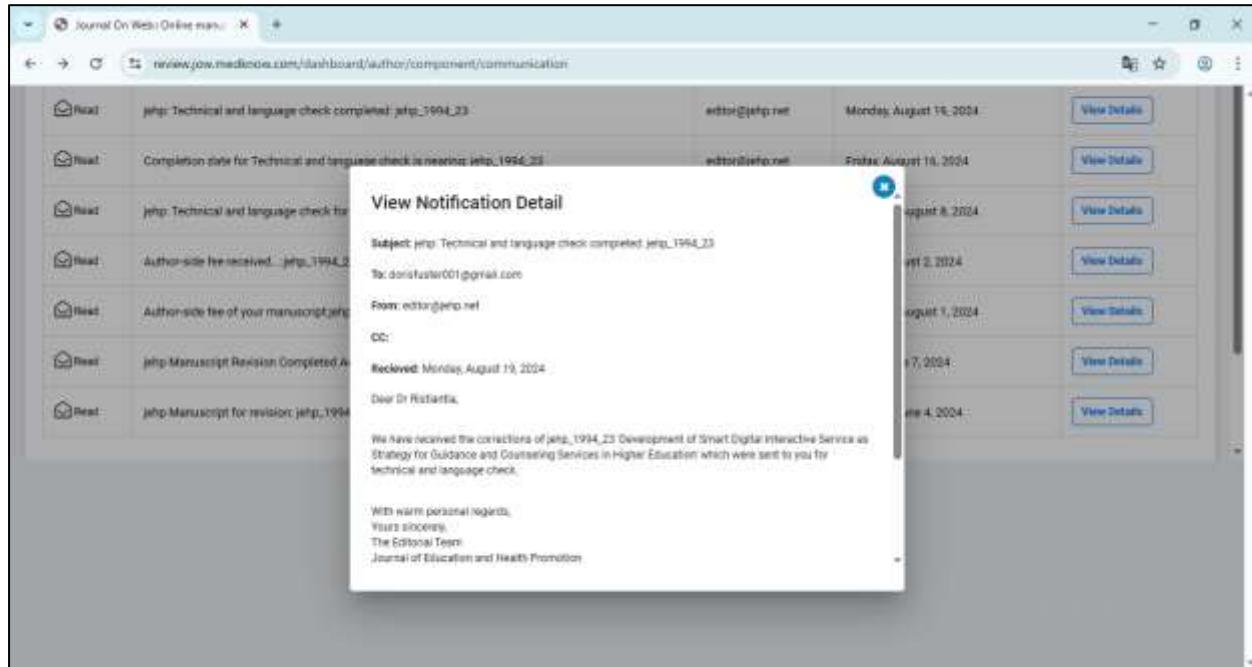
Table 2: Student response to smart digital interactive service products					
Respondent <u>Variables</u>	Number of items	Score	%	Average	Category
10 Student Respondents					
Service Process (10)	100	435	88.4%	91.35%	Very
Content of Services (8)	80	373	93.2%		Worth It
Service Communication (10)	100	462	92.4%		
30 Student Respondents					
Service Process (10)	300	1305	87%	89.01%	Very
Content of Services (8)	240	1119	93.25%		Worth It
Service Communication (10)	300	1302	86.8%		
Source: Prepared by the author (2023)					

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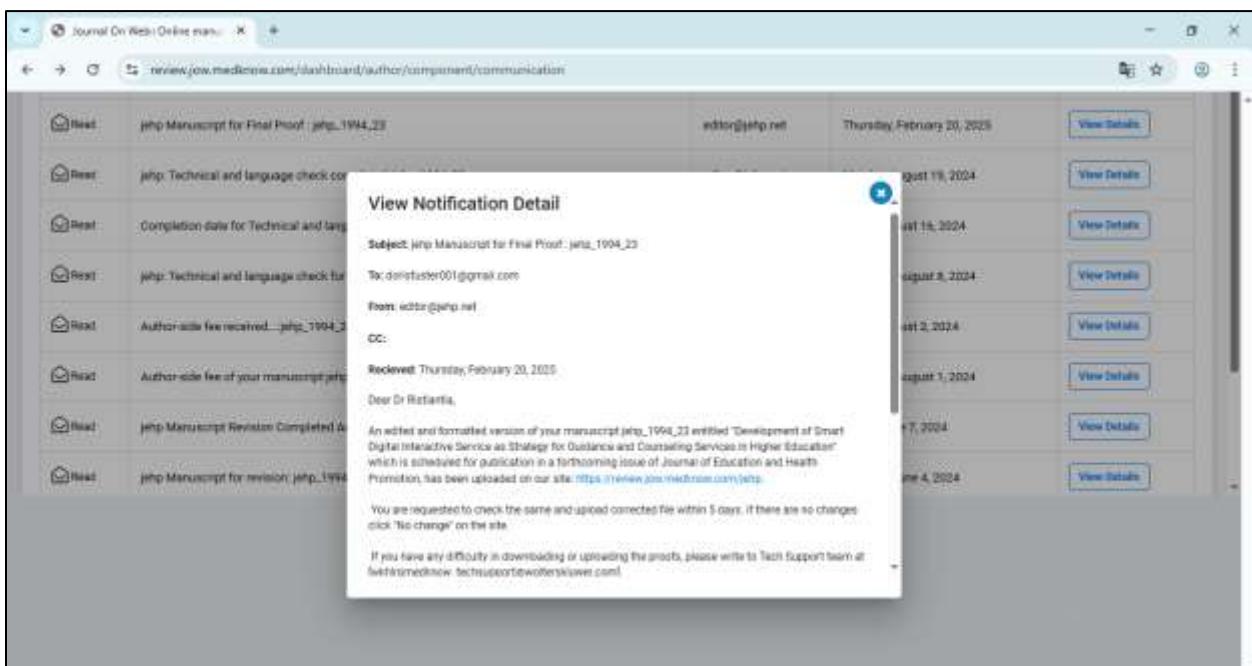
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An edited and formatted version of your manuscript jehp_1994_23 entitled "Development of Smart Digital Interactive Service as Strategy for Guidance and Counseling Services in Higher Education" which is scheduled for publication in a forthcoming issue of Journal of Education and Health Promotion, has been uploaded on our site: <https://www.jow.mediawebsoftersolutions.com/jehp>.

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Development of smart digital interactive service as a strategy for guidance and counseling services in higher education

Dina Hajja Ristianti, Wandi Syahindra¹, Jumansyah Jumansyah², Marlena Marlena³, Mohamad Aziz Shah Bin Mohamed Arip⁴

Abstract:

The digitalization of guidance and counseling services are easy to access and effective in higher education. This study aims to develop Smart Digital Interactive Service as a strategy for guidance and counseling services in higher education. This study is a form of Research and Development (R&D) research that employs the waterfall approach model, which consists of four primary phases: Planning, analysis, design, and implementation. Research subjects were selected by purposive sampling, where subjects were selected based on specific objectives. Smart Digital Interactive Service products are assessed by four phases: information technology experts and guidance and counseling experts and content experts. The effectiveness of the product was evaluated by 15 students on a limited scale, and then by 30 students on a larger scale. Using questionnaires, researchers gathered information on the effectiveness of Smart Digital Interactive Service products as guidance and counseling service strategies in universities. The scores were assessed in percentages and grouped based on the "eligible" category. The outcomes demonstrated that Smart Digital Interactive Service development is "highly practicable." The evaluation is based on the advantages, functions, communication, material content, language, and communication. This study demonstrates that Smart Digital Interactive Service is "feasible" for use in higher education as a strategy for guidance and counseling service delivery.

Keywords:

Guidance and counseling, higher education, smart digital interactive service

Introduction

The global Coronavirus disease 2019 (COVID-19)^[57] pandemic has accelerated digital transformation significantly.^[1,3] Almost all human activities utilize digital technology, notably communication, due to social restrictions to maintain health protocols.^[4,6] In education, the percentage of digital technology used by the population aged 5–24 years for communicating is increasing.^[7] This digital use is consistent with the concept of the Industrial Revolution 4.0, in which digitalization is linked to the internet.^[8] This digital transformation

requires universities to accelerate the transformation of the education system towards digitalization^[2,9]. Today's rapidly growing digital transformation requires universities to innovate to survive and compete consistently.^[10,11] Higher education institutions must integrate all learning services and activities using digital technology.^[5,12,13]

Guidance and counseling services, as an essential part of a university, are required to continue to innovate in providing services to students.^[14–16] Cyber counseling^[17,18,19,20,21] or internet counseling^[22,23] or online counseling^[24,25] are already prevalent in

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1 guidance and counseling services. The purpose of
 2 digitizing counseling services is to make them more
 3 accessible or practicable due to the fact that they are
 4 independent of location and time.^[26] The digitization of
 5 counseling services is one solution for counseling services
 6 that are limited by the lack of counseling opportunities
 7 (clients) to visit counselors due to the distance and
 8 relatively excellent location of counselors^[23,27] They are
 9 a solution due to clients' anxiety when meeting directly
 10 with counselors, a solution for counselors who do not
 11 have the opportunity to meet directly with clients, and
 12 a solution due to the pandemic's limitations.^[28,29,30]

14 One of the studies conducted by M. G. Shahamabadi,
 15 et al.^[31] during the COVID 19 pandemic at Imam Jafar
 16 Sadegh Hospital in Meybod, Iran, where a study was
 17 conducted on 80 women with a history of miscarriage
 18 by providing online counseling to them. The results of
 19 the study showed that online counseling was effective
 20 in reducing the level of anxiety felt by women after
 21 miscarriage. In addition, the research conducted by Amini
 22 N et al.^{l.} examined 184 health workers and 184 clients at the
 23 Health Center at TUMS (Tahenran University of Medical
 24 Sciences) from January 20 to May 21, 2021 by providing
 25 online training and counseling to them. The results of
 26 the study show that online counseling on a healthy
 27 lifestyle in primary health services can control the risk
 28 factors of non communicable diseases for clients and
 29 improve online counseling skills for health workers.^[32]
 30 One form of digitizing services for students in higher
 31 education is the use of online based Acceptance and
 32 Commitment Therapy (e ACT) in Malayisa. The study
 33 examined the effectiveness of e ACT on psychological
 34 flexibility and mental well-being assessed among 52
 35 Malaysian undergraduate students aged between 18
 36 and 23 years during the pandemic. Participants received
 37 two online e ACT sessions (a total of 5 hours). The
 38 results showed that there was a significant increase in
 39 mindfulness, psychological flexibility, and well-being
 40 among students.^[33]

41 The digitalization of guidance and counseling services
 42 in higher education is an effective and efficient means
 43 of establishing communication between counselors and
 44 service subjects (clients), where counseling or services
 45 are typically only provided in the form of relationships
 46 within a face to face digital academic framework.^[13,34 37]
 47 However, communication relationships that are framed
 48 academically and guidance and counseling service are
 49 usually done through social media, Facebook, Instant
 50 Messenger (IM), or email.^[26] This is unfortunate because
 51 online counseling is not made programmatically or
 52 deliberately, so the activities of guidance and counseling
 53 services are limited to ordinary "online vents" without
 54 being framed by the professional ethics of guidance and
 55 counseling.
 56

1 The guidance and counseling service program
 2 component of higher education includes essential
 3 services, responsive services, individualized planning,
 4 and system support.^[38,39] Essential services can be done
 5 through classical and group strategies by providing
 6 orientation and information services programmatically.
 7 Responsive services are conducted through individual
 8 and group counseling strategies, consultation, handover,
 9 and peer guidance. Personal planning services are
 10 carried out through individual and group assessment
 11 strategies, advisory, placement, and distribution. System
 12 support is done through professional development
 13 strategies and collaboration. The many types of digitally
 14 integrated guidance and counseling service development
 15 have not met all components of universities' guidance
 16 and counseling service programs and guidance and
 17 counseling service strategy. The digitally integrated
 18 guidance and counseling service is only limited to
 19 individual counseling services that respond to students'
 20 needs to escape their problems.

21 The readiness of guidance and counseling services to
 22 take advantage of purposefully created or programmed
 23 digital technology is required so that students from
 24 generations who are very familiar with digitalization^[40,41]
 25 can make the most of guidance and counseling
 26 services.^[42] Digitalized guidance and counseling
 27 services are a medium specifically designed to meet
 28 the needs of psychological consultation services for
 29 students in higher education, provide convenience for
 30 students to access services while remaining framed in
 31 the professional ethics of guidance and counseling, and
 32 offer counselors comfort in archiving data and storing
 33 all service records.^[26] Digital guidance and counseling
 34 services allow students and counselors to communicate
 35 asynchronously via chat or email. At any time, students
 36 want to ask questions or share their concerns, and
 37 counselors can respond. This increases communication
 38 flexibility and allows for more frequent interactions.^[43]

39 The process of accrediting higher education institutions
 40 includes counseling services. Criterion 3 of the Student
 41 Policy^[44] addresses counseling services. IAIN Curup, one
 42 of the institutions in Bengkulu province, has a guidance
 43 and counseling service unit that offers counseling,
 44 academic, and development services. This counseling
 45 service still employs a conventional system or requires
 46 direct meetings with a counselor, resulting in numerous
 47 obstacles and challenges.

48 In conventional counseling services, numerous obstacles
 49 exist. There are currently no optimally digitally integrated
 50 counseling and guidance services. It is necessary to
 51 develop guidance and counseling services that students of
 52 the millennial generation can readily access and that meet
 53 all components of university guidance and counseling

programs and service strategies. In this study, a digitally integrated guidance and counseling service strategy will be developed with the title "Smart Digital Interactive Service as a Guidance and Counseling Service Strategy for the Millennial Generation in Higher Education." This study is expected to produce a significant finding that can be implemented as a counseling and guidance service strategy in universities today.

Material and Methods

Study design and setting

This research develops Smart Digital Interactive Service with the Hannafin and Pack approach model which consists of four phases, namely the needs assessment phase, the design phase, and the development and implementation phase. In the first phase, the researcher identified the needs of students for digital-based counseling services so that the development of Smart Digital Interactive Service is needed. In the second phase, the researcher prepares a flowchart of program stages and media content in Smart Digital Interactive Service. The third stage of the development of Smart Digital Interactive was tested on experts and then tested on small groups and large groups of student respondents at the State Islamic Institute (IAIN) Curup, Bengkulu Province, which started from July 8, 2022, to October 28, 2022.

Study participants and sampling

The first phase is the phase of identifying student needs for guidance and counseling services in Higher Education. IAIN Curup has 24 study programs consisting of S1, S2, and S3, and the number of active students for the odd semester period of 2022/2023 is 4674 people. For the large number of students, of course, the conventional offline services at the Guidance and Counseling Service Laboratory are not effective where the available counselors are only six people. Therefore, it is important to have digital-based guidance and counseling services that can be accessed online so that guidance and counseling services in higher education can be provided equally to all students. The design phase is based on an analysis of the needs of guidance and counseling services in universities. The system description is designed using process modeling, which functions to determine the user, system input, process, and output generated by the system so that the designed system can run according to the direction and flow of the system using a context diagram. After the development of the menu bar on the Smart Digital Interactive Service product, the Smart Digital Interactive Service product was tested or validated twice by information technology experts and two guidance and counseling experts.

In the second phase, the researcher prepares a flowchart of program stages and media content for the Smart Digital

Interactive Service. The third stage of Smart Digital Interactive development, which is tested on experts (expert judgment) is then tested on small and large groups of student respondents to assess the use of Smart Digital Interactive Service.

The next step to see the extent to which the Smart Digital Interactive Service product can be used by students is to be assessed by students as respondents. The assessment by the respondents was carried out in two stages, the first was a small group of 10 students and a large group of 30 students.

Intervention

To assess the use of IAIN Curup's Smart Digital Interactive Service product, the researcher gave respondents an explanation of how to access IAIN Curup's SmartCounseling account. After that, students register to get a username and password so that students can log in to the Smart Digital Interactive Service IAIN Curup account. Each student has access to online counseling sessions that are arranged periodically for eight weeks via video call or chat with a counselor. They also have access to online discussion forums, where they can interact with their peers and counselors to get social support and share experiences.

Data collection tools and techniques

In this study, a checklist questionnaire with a Likert scale of 28 items was used.

Each questionnaire has three parts: service process, service content, and service communication. In this study, the questionnaire was assessed by two programmers and three guidance and counseling experts. The questionnaire trial was given to 30 students.

Analysis

Data analysis with Chi-square test, one-way, and independent t-variance analysis using SPSS software version 16. Cronbach's alpha calculation yielded a value of 0.82, which indicates that the questionnaire has good internal consistency.

Results

(1) Needs Assessment Phase

The first phase identifies the guidance and counseling requirements of higher education students. IAIN Curup offers 24 degree programs consisting of S1, S2, and S3; the number of active students for the odd semester of 2022/2023 is 4,674 individuals. With only six counselors available, the Guidance and Counseling Service Laboratory's conventional offline services are ineffective for many students. Therefore, the significance of digital guidance and counseling

1 services that can be accessed online, so that guidance
 2 and counseling services can be provided uniformly
 3 to all university students, is highlighted.

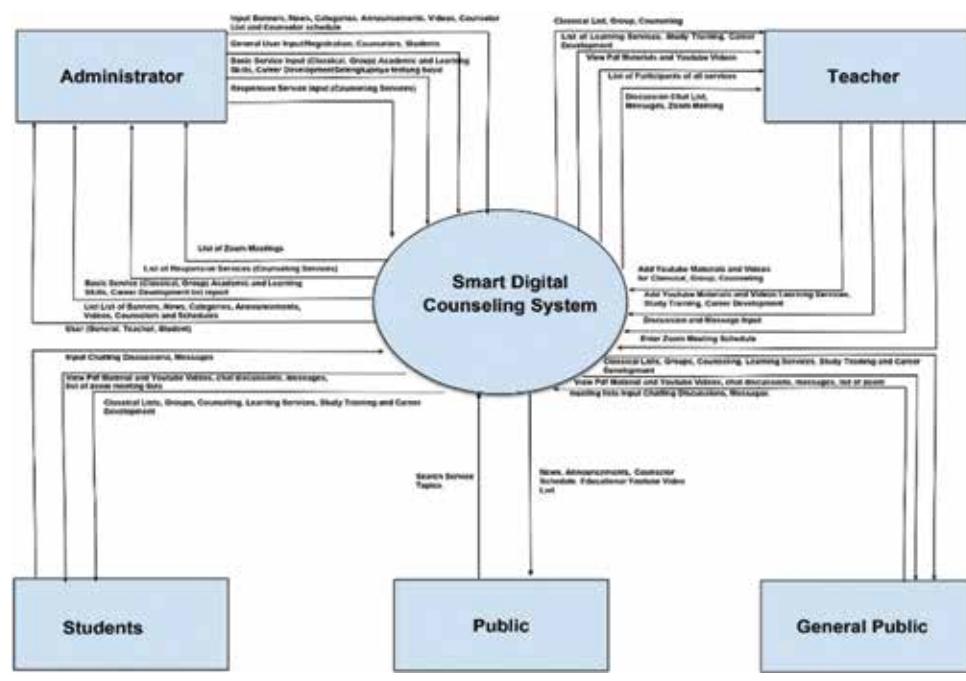
4 (2) Design Phase

5 The design phase is based on analyzing the need for
 6 guidance and counseling services in higher education.
 7 System depiction is designed using process modeling,
 8 which determines users, system inputs, processes,
 9 and outputs produced by the system so that the
 10 system can run according to the direction and flow
 11 of the system using context diagrams. The following
 12 describes the context diagram of the *smart digital*
 13 *interactive service* system. The design results are shown
 14 in Figure 1 below:

15 In the system process modeling above, depicted in
 16 the form of a system context diagram, it is known
 17 that there is an incoming data flow to be processed
 18 by the system, and the system provides output to
 19 each entity. The Smart Digital Interactive Service
 20 Application System consists of the Smart Digital
 21 Interactive Service System Process and several
 22 entities, including administrator entities, teaching
 23 entities, student entities, general entities, and public
 24 entities, where all entities are involved in inputting
 25 into the Smart Digital Interactive Service system
 26 processes. Consequently, each entity will receive the
 27 results of The Interactive Service's processing by the
 28 Smart Digital system.

29 The description of the flow of all entities ranging
 30 from administrator entities, teaching entities,
 31 student entities, general entities, and public entities
 32 can be described as follows: a) The Smart Digital
 33 Interactive Service system process includes a

1 component that functions as a data processor for
 2 requests from entities so that the system process can
 3 deliver the intended outputs and regulations for
 4 each entity; b) The administrator entity is an entity
 5 with full control over the system, including the
 6 ability to submit news, categories, announcements,
 7 YouTube video lists, counselor lists, and counselor
 8 schedules. This administrator is also responsible for
 9 adding user accounts for instructors, general users,
 10 and students. Users and passwords are generated
 11 by the administrator so that the system can process
 12 the user and password sent to the user's email. The
 13 administrator helps create basic service categories
 14 and responsive services consisting of classical, group,
 15 and individual use. This administrator also divides
 16 the service section into academic learning services,
 17 study skills services, or learning training and career
 18 development services. The administrator also functions
 19 as a control for grouping participant data that will be
 20 included in services that have been planned according
 21 to the request of counselors; c) Teaching entities are
 22 entities that can upload content in the form of pdfs
 23 and YouTube videos, create discussion chats, schedule
 24 zoom meetings, and upload materials for classics,
 25 groups and counseling for learning services, learning
 26 training, and career development; d) Student entity is
 27 an entity that can receive services that can be accessed
 28 according to the intended service designation, such
 29 as learning services, learning training services, and
 30 career development services for classical, group, and
 31 counseling categories, in addition to more interactive
 32 responsive services through zoom meetings; e) The
 33 general entity is identical to the student entity in that



56
 49 Figure 1: System context diagram

1 it is an entity that can receive services according to the
 2 desired service designation, such as learning services,
 3 learning training services, and career development
 4 services for classical, group, and counseling categories,
 5 as well as more interactive responsive services
 6 through Zoom meetings; and f) Public entities are
 7 entities that have access to news, announcements,
 8 counselor schedules, educational YouTube videos,
 9 and can search for counseling-related topics via the
 10 Smart Digital Interactive Service website.

11 (3) Design and Implementation Phase

12 Researchers consulted expert developers to set the
 13 menu bar on the virtual display. The time it takes
 14 is quite long. Errors in programming languages,
 15 Html, and coding lead to errors in giving commands.
 16 In addition, it is necessary to evaluate several
 17 parties to collect input in the form of menu bar
 18 work functions, colors, design, content, discussion,
 19 and communication before validating based on
 20 instruments. The results of development are shown
 21 in the following design, Figure 2.

22 Administrators, teachers, students, and general and
 23 general users can log in using the username and
 24 password the admin sent in their email. The login
 25 menu can be seen in Figure 3 below.

26 Smart Digital Interactive Service products feature a
 27 menu bar that includes banners, news, categories,
 28 announcements, videos, counselors, messages, and
 29 users, as well as an application menu bar that includes
 30 basic services, responsive services, and Zoom. The
 31 menu bar for the Smart Digital Interactive Service
 32 product is shown in Figure 4.

33 After developing a menu bar for the Smart Digital
 34 Interactive Service product, experts in information
 35 technology and guidance and counseling conducted
 36 two tests or validations of the Smart Digital Interactive
 37 Service product. The assessment of information
 38 technology experts is based on three domains: the use

1 side, the display side, and the function side. Expert
 2 assessment of guidance and counseling encompasses
 3 three domains: the design aspect, the content aspect,
 4 and the communication process aspect. The results
 5 of *Smart Digital Interactive Service* product validation
 6 can be seen in the following Table 1.

7 The results of expert validation revealed that the
 8 average score attained by information technology
 9 experts was 84.4% and that of guidance and
 10 counseling experts was 81.1%. The score falls within
 11 the acceptable range. Domain utilization validation
 12 by an information technology expert received a score
 13 of 82%, the Display domain received a score of 67%,
 14 and the Function domain received a score of 70%.
 15 The Design domain received a validation score of
 16 82% from guidance and counseling experts, while
 17 the Content domain received a validation score of
 18 67% and the Communication domain received a
 19 validation score of 79%. From expert validation scores
 20 on Smart Digital Interactive Service products, it is
 21 possible to conclude that Smart Digital Interactive
 22 Service products are "feasible" for use in universities
 23 as guidance and counseling services for millennials.
 24 The next step will be to determine how well students
 25 can use Smart Digital Interactive Service items.
 26 Students serve as respondents in an assessment.
 27 There were two stages used to assess the respondents.
 28 The first consisted of a small group of ten people
 29 and a large group of thirty people. The results of the
 30 respondents' assessments are shown in Table 2.
 31 Based on the assessment results of a small group of
 32 student respondents (10 persons), the average score
 33 received by Smart Digital Interactive Service items is
 34 91.35%, which places them in the very good category.
 35 Similarly, the results of the big group evaluation
 36 (30 persons) yielded an average score of 89.01%,
 37 which falls into the category of very good. Based on
 38 the assessment of student responses, it is possible to
 39 conclude that the Smart Digital Interactive Service
 40 product can be used as a method for delivering
 41 guidance and counseling services to the millennial
 42 generation in higher education.



Figure 2: Smart digital interactive service initial display

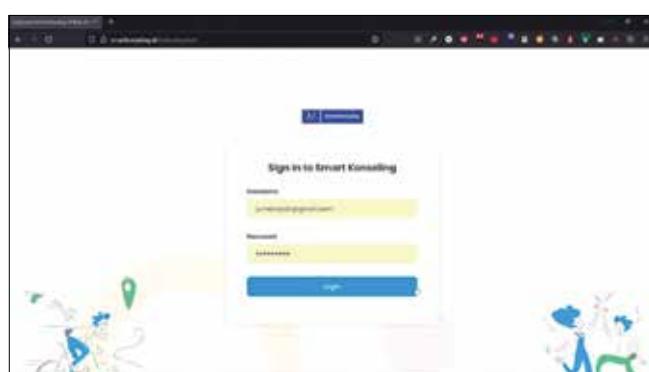


Figure 3: Login menu on smart digital interactive service

1 **Table 1: Validation of information technology experts and guidance and counseling experts** 2

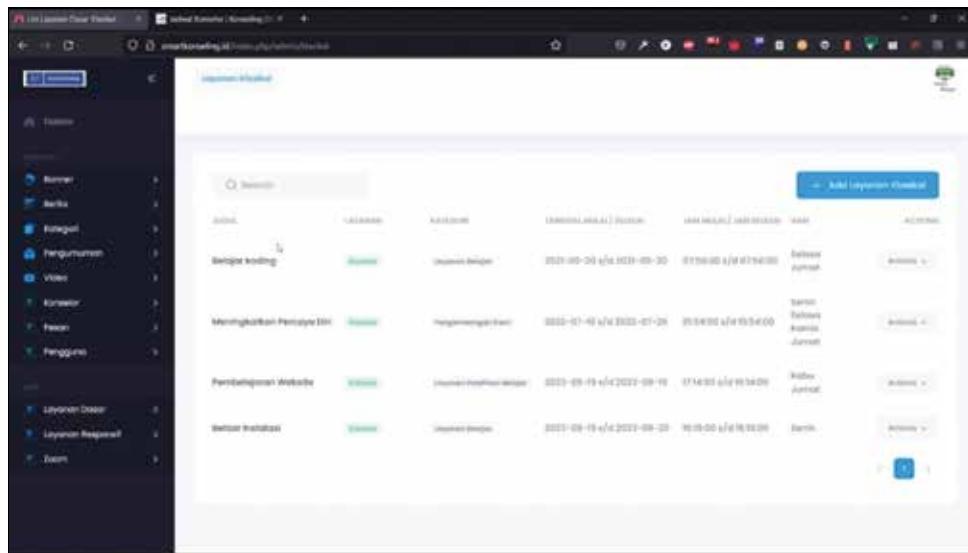
Members	Variable	Total	ST	S	TK	TS	STS	Total	Average	Category
Information Technology Expert (2)	Use	100 (10)	10	63	3	0	0	82%	84.4%	Proper
	Display	80 (8)	15	52	0	0	0	67%		
	Function	80 (8)	30	40	0	0	0	70%		
Guidance and Counseling Expert (2)	Design	100 (10)	5	76	7	0	0	82%	81.5%	Proper
	Accounts	80 (8)	15	52	4	0	0	67%		
	Communication	100 (10)	0	76	3	0	0	79%		

9 ST=strongly agree, S=agree, TK=no decision, TS=disagree, STS=strongly disagree. Source: Prepared by the author, (2023)

10 **Table 2: Student response to smart digital interactive service products** 11

Respondent variables	Number of items	Score	%	Average	Category
10 Student Respondents					
Service Process (10)	100	435	88.4%	91.35%	Very Worth It
Content of Services (8)	80	373	93.2%		
Service Communication (10)	100	462	92.4%		
30 Student Respondents					
Service Process (10)	300	1305	87%	89.01%	Very Worth It
Content of Services (8)	240	1119	93.25%		
Service Communication (10)	300	1302	86.8%		

20 Source: Prepared by the author (2023)

40 **Figure 4: Smart digital interactive service product menu bar** 41

42 Discussion

43 Based on the research results of Smart Digital Interactive Service product development, it is strongly advised to 44 adopt Smart Digital Interactive Service products at 45 universities. Students require supervision and direction 46 to conduct daily activities well and effectively in order 47 to develop optimally and prevent academic problems. 48 [35,36,39,45] They can gain guidance and direction without 49 having to meet with a counselor or enroll in a specific 50 class. This makes it very easy for people to gain access 51 to services that are available instantaneously through 52 digital media. [1,12,40,46,49] However, smart digital interactive 53 service is still only a complement to university guidance 54 and counseling

55 activities. Face to face service activities must still be 56 carried out. [50]

57 Smart digital interactive service products have the 58 following advantages: 1) Save time and money by 59 avoiding requiring students to devote additional time 60 to accessing or receiving guidance and counseling 61 services [51]; 2) Students have the ability to contact 62 guidance and counseling services at any time and 63 from any location as long as they have an internet 64 connection, [52] and they can decide when it is suitable 65 to do so; 3) The standardization of services obtained 66 by students is not much different from the standard 67 of services carried out face to face. [47,53] Through this 68 intelligent digital interactive service site, students get 69

the same counseling services as face to face counseling services. Students' academic abilities can be improved through services on smart digital interactive service sites, and student problems can also be addressed through smart digital interactive service sites. The activities of guidance and counseling services through intelligent digital interactive service sites follow the mandate of the international counseling service association, which can maintain confidentiality and are easy to use.

The smart digital interactive service product has a "discussion" feature that allows students to form a community of support where they can share experiences, get emotional support, and overcome problems together. The experience and perspective of their friends can help them understand the problem and find a solution. The discussion feature supports multi directional interaction, where students and counselors can interact with each other and with multiple teachers at once. This creates an ever changing environment and where people work together. Students can undertake projects or group assignments, work together to find solutions, and share helpful resources.^[41,54]

Previous studies on the benefits of technology in guidance and counseling services are in line with the findings of this study. For example, one of the studies conducted by M.G. Shahamabadi, *et al.*^[31] during the COVID 19 pandemic at Imam Jafar Sadegh Hospital in Meybod, Iran where a study was conducted on 80 women with a history of miscarriage by providing them with online counseling. The results of the study showed that online counseling was effective in reducing the level of anxiety felt by women after miscarriage. In addition, a study conducted by Ramezankhani, *et al.* examined 184 health workers and 184 clients at the Puskesmas of TUMS (Tahenran University of Medical Sciences) from January 20 to May 21, 2021 by providing them with online training and counseling. The results of the study show that online counseling for a healthy lifestyle in primary health care can control the risk factors of non communicable diseases in clients and improve online counseling skills in health workers.^[32]

This research also supports research conducted by Rahmati, which shows that there is an increase in awareness and attitudes towards fertility and fertility counseling skills of health workers, both using face to face training methods and through virtual training.^[55] In addition, Eysenbach stated that online communities and support groups can provide significant psychosocial benefits.^[15,48,56] It was also found in the study, where students reported the benefits of the group discussion feature, which allowed them to interact in real time with counselors and peers.

Limitation and recommendation

In terms of guidance and counseling services in universities, the development and implementation of smart interactive services has many advantages, namely 1) Scalability where when compared to face to face services, digital services are cheaper. This allows more students to receive counselling support, 2) Personalization where interactive technology allows services to be better personalized to meet the unique needs of students, 3) Data Collection where digital platforms make data collection and analysis faster, which makes it easier for counsellors to track student progress and tailor interventions in real time.

Based on this study, some suggestions for the next research. To increase the generalization of research results, it is necessary to conduct research with a larger and more diverse sample. Long term research is needed to observe the sustainable impact of digital guidance and counseling services in higher education.

Conclusion

The Smart Digital Interactive Service product design is geared to the guiding and counseling service strategy of basic, responsive, and system support services. Smart Digital Interactive Service products are created by merging websites and applications, which may be accessed via <http://smartcounseling.iaincurup.ac.id/> pages. Smart Digital Interactive Service products are accessible to administrators and users, who include counselors, students, and general users.

The data shows that the accessibility of guidance and counseling services through digital platforms is increasing, and the level of student satisfaction with guidance and counseling services is also increasing. Users say that interactive features such as discussion forums, chats, and video calls help them feel more supported and more actively involved in the process of guidance and counseling services.

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Conflicts of interest

There are no conflicts of interest.

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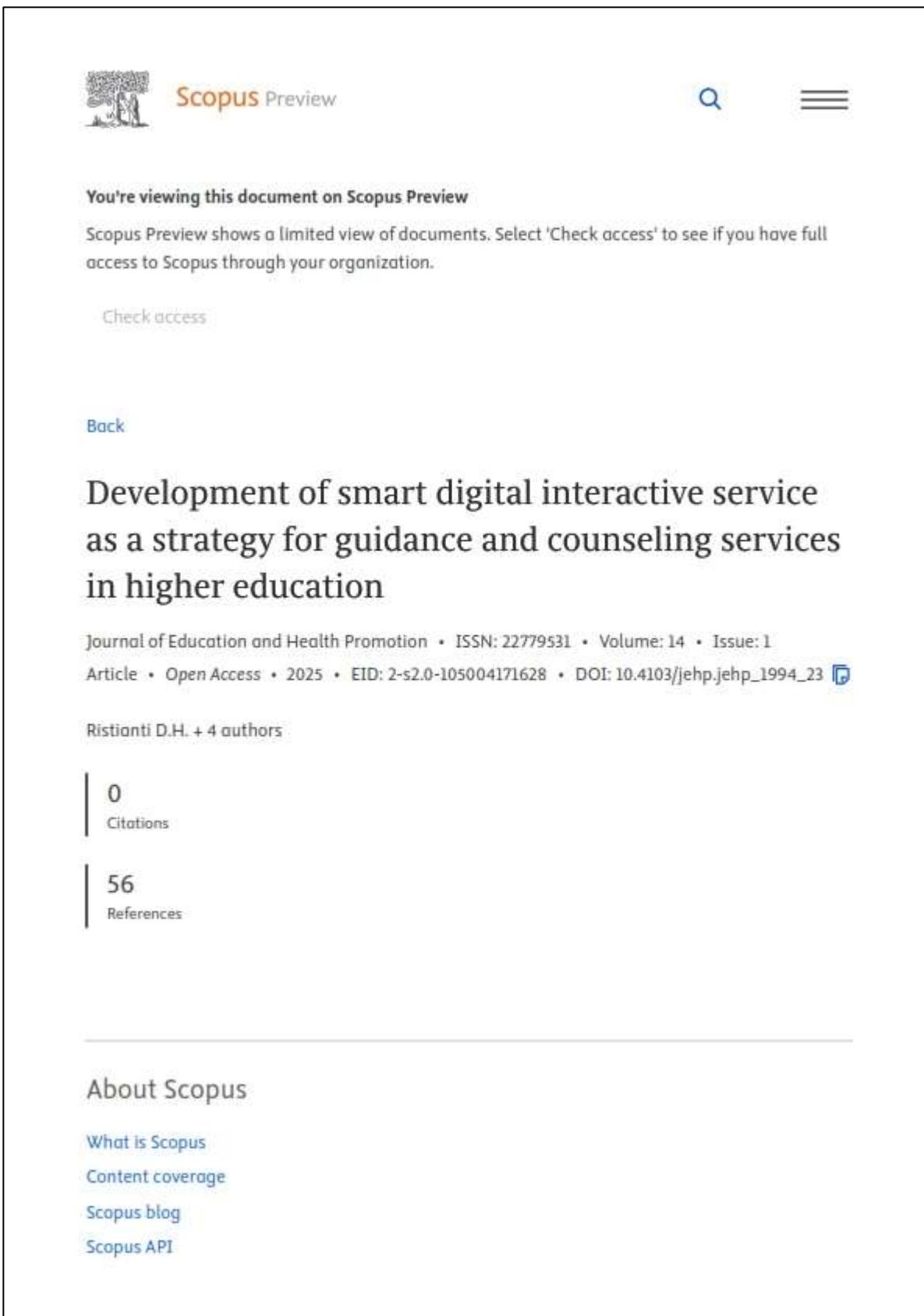
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9. Published Manuscript (April 2025)

The screenshot shows the journal's homepage with the article details. The article title is 'Development of smart digital interactive service as a strategy for guidance and counseling services in higher education'. It is categorized as a 'BRIEF REPORT'. The authors listed are Ristianti, Dina Hajri; Syahindra, Wardi¹; Jumansyah, Jumansyah²; Marlina, Marlina³; Arif, Mohamad Aziz Shah Bin Mohamed⁴. The DOI is 10.4103/jehp.jehp_1994_23. The journal issue is 14(1):141, April 2025. The page includes a sidebar with download options (Online, Images, Download, Cite, Open) and a 'Related Articles' sidebar on the right.

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