
Research-Based Digital Learning Model in Higher Education

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Abstract

This study aims to determine the transition from conventional learning to digital learning. The research method is Research and Development carried out at IAIN Parepare. The research stages start from FGD, product design, expert validation, product testing, verification, publication and implementation. This research shows that research-based digital learning is very important and must be implemented. Research-based digital learning utilizes digital features in creating content, research as a strategy in implementing learning. The results of the research are made up of content as teaching materials, then setting the evaluation system in the form of assessment tools. Digital collaboration and research in learning can accommodate student learning styles that are independent, thorough, inquiry, problem solving, contextual, authentic, and collaborative

Keywords: *learning, literacy, digital, research, higher education*

Model Pembelajaran Digital Berbasis Riset di Perguruan Tinggi

Abstrak

Penelitian ini bertujuan untuk mengetahui transisi dari pembelajaran konvensional ke pembelajaran digital. Metode penelitian adalah Research and Development yang dilaksanakan di IAIN Parepare. Tahapan penelitian dimulai dari FGD, desain produk, validasi ahli, pengujian produk, verifikasi, publikasi dan implementasi. Penelitian ini menunjukkan bahwa pembelajaran digital berbasis penelitian sangat penting dan harus dilaksanakan. Pembelajaran digital berbasis penelitian memanfaatkan fitur digital dalam membuat konten, penelitian sebagai strategi dalam melaksanakan pembelajaran. Hasil penelitian berupa konten sebagai bahan ajar, kemudian ditetapkan sistem evaluasi berupa perangkat penilaian. Kolaborasi dan riset digital dalam pembelajaran dapat mengakomodasi gaya belajar siswa yang mandiri, teliti, inkuiri, pemecahan masalah, kontekstual, autentik, dan kolaboratif

Kata-kata kunci: *pembelajaran, literasi, digital, penelitian, pendidikan tinggi*

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A. Introduction

Universities as par of excellence institutions in the development of science and technology and become agents of civilization and social transformation. Universities will be creative and become pioneers of change, both in the surrounding community and in the advancement of science¹. Research is an important means to improve the quality of learning². Higher education actually stands at the forefront of reconstructing the education system that leads to competitive and productive abilities for its alumni. Staron (2014) states that "Life-based learning proposes that learning for work is not restricted to learning at work" .

Universities are actually able to follow the latest technological trends, which are a barometer of developing education, they need to find methods to develop students' cognitive capacity: higher order mental skills, critical and systemic thinking, and it is very important to survive in the era of the industrial revolution 4.0. The paradigm of the learning system in higher education refers to indicators of self-concept, experience, learning readiness, and learning orientation ³. Quality learning in higher education if the teaching material is the result of lecturer research⁴. The concept of authentic learning (Roach, 2000) is using data in the field with course content developed by the lecturer.

The Directorate of PTKI encourages PTKI in the era of the industrial revolution 4.0, namely: (1) Preparation of a more innovative learning system; (2) Reconstruction of institutional education policies that are adaptive and responsive to the industrial revolution 4.0; (3) Preparation of human resources, especially lecturers and researchers as well as engineers who are responsive, adaptive, and reliable to face the industrial revolution 4.0; (4) Breakthroughs in research and

¹ Hasbullah, *Otonomi pendidikan: kebijakan otonomi daerah dan implikasinya terhadap penyelenggaraan pendidikan* (Jakarta: Rajawali Pers (RajaGrafindo Persada), 2006).

² Hasan Subekti dkk., "Patrap Triloka ethno-pedagogy with research-based learning settings to develop capability of pre-service science teachers: Literature review" (1st Annual International Conference on Mathematics, Science, and Education (ICoMSE 2017), Atlantis Press, 2017), 43–46.

³ Triyo Supriyatno, "Sudiyono, Moh," *Padil, Pengantar pada Strategi Pembelajaran Partisipatori di Perguruan Tinggi. Cet. I, t.t.*

⁴ Griffith, *Institute for Higher Education (2008). Research-based learning: strategies for successfully linking teaching and research* (University of Griffith, t.t.).

development that support the industrial revolution 4.0 and its quality and quantity research and development ecosystem; (5) Breakthrough innovation and strengthen the innovation system to increase industrial productivity and increase technology-based start-ups⁵.

Prospective job opportunities are more directed to the world of Robotics, Internet on things (IoT), autonomous vehicles, 3-D printing, nanotechnology, biotechnology, materials science energy storage, and quantum computing. The trend of learning leads to lecturers using various facilities such as multimedia-based⁶. The characteristics of the industrial revolution 4.0 include digitization, optimization and customization of production, automation and adaptation, human machine interaction, value added services and businesses, automatic data exchange and communication, and integrating the use of internet technology. The concept of developing Cyber University, admitted Anis, requires no small amount of money. "Such as bandwidth, online laboratories, computers, the internet, those are still obstacles. because it is still an expensive item in Indonesia⁷.

Research that is relevant to the proposed research plan. The research in question is as follows: (1) Putri S (2017), namely: Communication Effectiveness of Online Media Google Classroom in Supporting the Teaching And Learning Process at Civil Engineering University of Riau; (2) Fandianta, et all (2013), namely: Increasing Student Knowledge By Providing Teaching and Learning Flexibility Through Blended Learning Methods; (3) Sutisna (2016), namely: Development of Blended Learning Learning Model in Equality Education Package C Program in Improving Learning Independence; (4) Asnawi (2018), namely: Measurement of Usability of Google Classroom Applications as E-learning Using the USE Questionnaire (Case Study: UNIPMA Information Systems Study Program);

⁵ Kasinyo Harto, "Tantangan dosen ptki di era industri 4.0," *Jurnal Tatsqif* 16, no. 1 (2018): 0.

⁶ Richard E. Mayer dan Richard E. Mayer, *Multimedia Learning* (Cambridge University Press, 2001).

⁷ Muhammad Anis, *Distance Lectures at UI: Not Just a Matter of Material Transfer Process*, vol. 8, Report of Ristekdikti Magazine (Jakarta, Indonesia: DIKTI, t.t.).

Research-based digital learning is the expectation of higher education as an integrated distinction and projection in learning values of religiosity, humanism, research-based, and cutting-edge technology.

B. Method

The type of research used is qualitative, namely studying, exploring, and constructing a research-based digital learning system that is relevant to the era of the industrial revolution 4.0 which can be adapted to the IAIN Parepare campus. This research approach is carried out by Research and Development (R & D). The steps of this research are: (1) research and information gathering, (2) planning, (3) development of the initial form of the product, (4) initial field test, (5) main revision of the product, (6) main field test, (7) operational product revision, (8) operational field test, (9) final product revision, and (10) dissemination and implementation ⁸.

Data collection can be done in various settings, various sources, and in various ways⁹. This research instrument is in the form of interview guide, observation guide, document study, FGD guide, discussion guide with experts, product trial guide, and publication guide. The data analysis technique used in this study is the approach applied by Miles and Huberman (Sugiyono, 2009), which is carried out in three activity lines which are one unit (interrelated), namely; (1) word reduction; (2) data presentation; (3) drawing conclusions/verification. Activities in qualitative data analysis are carried out interactively and take place continuously until complete, so that the data is saturated (complete) ¹⁰. The validity test of data in qualitative research according to Sugiyono includes credibility (internal validity), transferability (external validity), dependability (reliability), and confirmability (objectivity) ¹¹.

⁸ Meredith D Gall, "The use of questions in teaching," *Review of educational research* 40, no. 5 (1970): 707–21.

⁹ Sugiyono, *Metode Penelitian Kuantitatif Kualitatif dan R&D* (Bandung: Alfabeta, 2008).

¹⁰ Sugiyono.

¹¹ Sugiyono.

C. Result & Discussion

1. Result

a. The trend of digital-based research learning

Digital learning in higher education is very important to be developed as an effort to use ICT in creating a conducive academic atmosphere. Campus as a vehicle for the transformation of science and technology that can be utilized for the benefit of society and civilization, can be more effective if using digital in the application of learning. ICT-based learning or digital learning is important to underlie learning theory in order to develop the personality of students in a balanced and proportional manner. Weller, in Ishak, explains that electronic learning, including mobile learning, is at least supported by constructivism theory, resource based learning, collaborative learning, problem based learning, narrative based teaching, situated learning¹².

Utilization of ICT can support the learning process, namely: (1) Improving the quality of learning; (2) Expanding access to education and learning; (3) Reducing education costs; (4) Responding to the obligation to participate in ICT; and (5) Develop ICT skills that students need when working and in later life¹³. Learning that utilizes ICT then develops into the digital realm as a result of technological acceleration through the industrial revolution 4.0. Adaptation of learning to the development of ICT has implications for digital learning. Digital learning provides new implications for the learning process between educators and students, both in content, interaction, mobile classes, digital teaching materials, evaluation systems, and so on.

In education, including in universities, the application of digital learning is carried out on several factors, namely: (1) The demands of the 4.0 industrial revolution such as big data, cloud computing, internet, artificial intelligence, and telefortace; (2) The existence of digital literacy that needs to be elaborated, both lecturers and students, such as media literacy, information literacy, and digital literacy, commonly called multiple literacy; (3) Mobile technology that is developing rapidly and is more practical, economical, capable, and portable; (4)

¹² Ishak Abdulhak, *E-Learning: Concept and Implementation*, II (Bandung: UPI Press, 2020).

¹³ Mamad Kasmad, *Information Technology-Based Learning and Learning* (Bandung: UPI Press, t.t.).

Regulations are getting stronger, both international, national, and at the level of the Education unit, through regulations and legislation from the government, the ministry of education and culture, the ministry of religion, and the level of educational institutions;

The background for applying digital learning is as follows; (1) demands for the needs of the all-digital era, (2) forcing conditions due to the Covid-19 pandemic that does not allow offline learning, and (3) demands for producing excellent graduates including skills in the IT field ¹⁴. Identification of problems in the world of research-based digital learning, especially in universities, as stated by Riyana¹⁵, are as follows: (1) Adaptation of the curriculum that has not been standardized fully supports the existence of digital learning, namely there is a digital learning mapping, such as mapping learning object materials, what digital learning steps are, the form of IT involvement has not been seen, and so on; (2) Digital literacy facilities are not evenly distributed, both for educators and students, as well as internet access in all corners of the country. ICT devices are still relatively expensive with high specifications such as laptops, licensed application features, and internet quota for personal use; (3) ICT literacy that is not evenly distributed and optimal for educators, especially the digital urban generation, conventional generation. Urgent educators to adapt and upgrade their competencies to the changes and dynamics of digitalization that have given birth to the latest and latest digital learning application features; and (4) Digital Mindset for educators and parents that needs to be improved, namely the adaptation of an advanced, open, objective, visual, and rational mindset that has become mainstream in the industrial revolution 4.0.

Research-based digital learning experienced various problems, especially during the Covid-19 pandemic, because it was revolutionary, lecturers and students were 'forced' to use ICT in learning due to social distancing considerations. Sutrisno explained that: The problems of implementing digital learning in universities, among others: (1) Limited ICT infrastructure owned by

¹⁴ Sutrisno, Professor of Islamic Religious Education, t.t.

¹⁵ Cepi Riyana, *MEDIA PEMBELAJARAN: Hakikat, Pengembangan, Pemanfaatan, dan Penilaian* (CV.Wacana Prima, t.t.).

universities, lecturers and students, (2) Internet network that is less stable, (3) Limited quota for students who are economically disadvantaged, (4) The PLN electricity network that often shuts down, (5) The limited skills of senior lecturers in the IT field, and (6) The time difference between students in East, Central and West Indonesia ¹⁶.

Research-based digital learning is an alternative solution to the learning approach in the industrial revolution 4.0 era in universities. The application of research-based digital learning is considered very important to give birth to digital learning innovations so that innovation products are more valid, scientific, and generalizable ¹⁷. The birth of new products that can be accounted for academically is more effective with the use of digital-based cloud computing. The results of scientific research are easier to do, especially in data analysis and browsing reference links and access to scientific publications. However, The perception of research-based digital learning in general is still relatively in-depth and comprehensive ¹⁸.

One approach that is important to consider in learning is student-centered and based on completeness. The learning approach in the era of the industrial revolution 4.0 is also referred to as heutagogy as first coined by Stewart Hase and Chris Kenyon (2000). Heutagogy emphasizes how a learner finds his learning experience through learning how he learns, multiple cycle learning, providing universal learning opportunities, the process is non-linear and leads to a true learner¹⁹.

Riyana explains the added value for lecturers to the application of research-based digital learning, namely: (1) Learning is based, scientific, and objective; (2) Effective optimal learning in achieving competence; (3) Actualization of lecturer performance, namely conducting research related to learning; (4) The research product becomes a portfolio of works; (5) Research products will be published; (6) The research product will be registered as IPR. The use of digital learning media

¹⁶ Sutrisno, Professor of Islamic Religious Education.

¹⁷ Riyana, *MEDIA PEMBELAJARAN*.

¹⁸ Sutrisno, Professor of Islamic Religious Education.

¹⁹ Johannes Reitingger, ed., *Theory of inquiry learning arrangements: research, reflection, and implementation* (Kassel: Kassel University Press, 2016).

has an impact on, namely (1) It can increase students' learning motivation; (2) The use of digital learning media can increase students' learning independence; (3) The use of digital learning media eliminates the limitations of space and time; (4) The use of digital learning media can clarify information; and (5) the use of digital learning media can reduce unnecessary costs ²⁰.

Digital media in research-based learning becomes effective and efficient if: (1) According to the characteristics of students, namely learning styles, interests, motivations, ideals, and so on; (2) The test results will be valid and reliable, namely the validity of the instrument and can be scientifically justified so that it can be used to collect data scientifically; (3) Repeated review, namely the examination of research results is carried out repeatedly to obtain saturated and perfect data; (4) Tested, ie research results can be verified on an ongoing basis so that they can be generalized to be applied to different places; and (5) very high eligibility ²¹.

b. Research-based digital learning design in universities

Academic response to the application of research-based digital learning as a mindset transformation of the academic community during the online learning process during the Covid-19 pandemic (FGD, 2021). Where did the Covid-19 pandemic start? digital-based learning transformation has implications for culture shock²² by most lecturers because they were previously used to conventional media. The Covid-19 pandemic urges and forces the academic community to carry out online learning because it is related to health protocols that must maintain distance and stay away from crowds (social distancing). On the other hand, learning activities in universities should not stop because they have big implications for the competence of the younger generation. This condition encourages lecturers and students to understand and master ICT and design digital-based learning.

The components that need to be considered in digital learning design are as follows: (1) There must be a clarity of competence that must be achieved; (2)

²⁰ Riyana, *MEDIA PEMBELAJARAN*.

²¹ Riyana.

²² Dewi Sri Kuning, "Culture Shock: Online Learning in the Covid-19 Pandemic Phase," *Jurnal Humaniora Dan Ilmu Pendidikan* 1, no. 1 (11 Juni 2021): 55-62, <https://doi.org/10.35912/jahidik.v1i1.357>.

Variety content, namely content that must vary in line with the clarity of goals, such as printed, digital, simple content, complex content, or from nature; (3) Methodology based on SCL, which is student-centered; (4) Digital media and learning materials; (5) Assessment tools and ICT support, namely the assessment follows the evaluation principles supported by ICT ²³. The study and results of the discussion in the FGD (2021) show that the application of research-based digital learning requires completeness, both superstructure and infrastructure. The superstructure field is in the form of policies from the leadership of PT, leadership instructions on consistent implementation, starting with the preparation of the vision, mission, goals, and objectives, Master Plan for Higher Education Development, Road Map for higher education, strategic plans (Renstra) from the institutional level to study programs, operational plans from the institutional level to study programs, quality standards and operational standards, curriculum level study programs that KKNI, SNPT, and MBKM standards based on digital and research. All forms of policy are linear and lead to research-based digital learning. and digital and research-based MBKM. All forms of policy are linear and lead to research-based digital learning. and digital and research-based MBKM. All forms of policy are linear and lead to research-based digital learning.

Information from the informant (UN, 2021) stated that, although in general it is adequate in the context of LMS, there are aspects that need to be addressed, such as Edlink which is one-way between lecturers and students, such as zoom applications, reciprocal interaction between lecturers and students is necessary. the form is opened so that the educational process can run effectively, the choice is limited to evaluation, namely multiple choice. However, Edlink can store digital teaching materials and can be connected to institutional repositories, videos, youtube, or online journal links as learning resources. Furthermore, the Edlink platform is quite good, and we are students, there are many things we can do through Edlink. However, the Edlink Platform is often inaccessible even though the internet network is good,

²³ Riyana, *MEDIA PEMBELAJARAN*.

These indicators can be found in learning outcomes that lack linearity with the achievement of the graduate profile. Profiles of graduates of study programs within the Faculty of Tarbiyah contain a profile of researchers and in the realization of this profile, several courses related to research methodology are given. The courses that are included to support the achievement of the graduate profile as researchers, seem inadequate because they are only mastered in aspects of science, while attitudes (characters) and psychomotor only begin to develop when students prepare thesis. The limitations of the courses and the large demands as researchers are listed in the graduate profile, so the proposed solution is the application of research-based digital learning.

FGD (2021) formulated a recommendation that the formulation of learning outcomes for each subject is important to consider using a research-based digital approach. Digitization in the field of learning is very helpful in conducting research, due to various access to sources and materials needed in research. Every research requires digital resources and materials, so that the learning outcomes of courses are very important to formulate a research-based digital learning approach (FGD, 2021). Each course has scientific characteristics and is always dynamic, so research-based digital learning provides space for lecturers and students to develop self-criticism and a culture of innovation. The formulation of learning outcomes for courses becomes a guide in designing, implementing, and evaluating the implemented learning models.

The study of the development of research-based digital teaching materials through FGDs, provides recommendations, including (a) Selecting applications that are considered relevant, mastered, and easily accessible; (b) Choose the application of digital teaching materials in the form of interactive books, e-books, pdf books, videos, or presentations; (c) Choose the application of teaching materials that are easy to design and in accordance with presentation standards; (d) Choose applications that can accommodate research results; (e) Select applications that open access to digital literature; (d) Strengthening digital, media, and information literacy (FGD, 2021). Mastery of the Edlink LMS platform is not enough to enrich the digital learning repertoire for students. Various variables that

are urgently controlled by lecturers such as making learning schedules through Sevima, connecting Sevima and Edlink, uploading assignments on Edlink,

The study of themes in FGDs resulted in information that the aspects that need to be developed by lecturers in research-based learning are the ability to formulate course problems that are accumulated into lecture themes, adapt these themes to be more actual, relate the themes to the student's daily environment, how to formulate problems. , how to compile relevant theoretical concepts, how to collect data, how to analyze data, and how to compile research reports, convert research reports into journal manuscripts, and submit manuscripts to online scientific journals (FGD, 2021). Competencies needed by students in research-based digital learning include digital presentation applications, digital teaching materials, digital references, digital learning media, assessment tools, and Edlink.

Digital learning that is applied Some lecturers use certain applications with assistance such as table pens, Canva, digital power points, the Moodle platform as an LMS that elaborates on Edlink, some use zoom, google meet, and Video Call WA. Lecturers are still limited in the use of digital applications in carrying out learning, perhaps due to the inability or ignorance of digital applications, time constraints, limited IT equipment, and various other problems (FGD, 2021).

The study in the FGD (2021) concluded that in the application of research-based digital learning, it is necessary to consider the use of problem-based learning strategies (problem solving), contextual-based, authentic-based, completeness-based, independence-based, and inquiry-based. Learning methods that can be developed are lectures, assignments, simulations, field trips, demonstrations, debates (discussions), inquiry, and other relevant methods. FGD activities (2021) formulated recommendations related to the application of research-based digital learning evaluation, including: (a) Considering Bloom's taxonomy aspects (cognitive, affective, and psychomotor); (b) Expanding the scope of student competencies based on scientific characteristics and course objectives; (c) Utilizing digital aspects in conducting evaluations and developing digital evaluation designs to accommodate main and additional competencies; (d) To

evaluate the research process and products; (e) Evaluation of the field of scientific publications.

Then, the FGD (2021) resulted in several identification of problems as obstacles in the application of research-based digital learning, including: (1) policies and decisions of IAIN Parepare leaders that are binding in the application of research-based digital learning; (2) Procurement of ICT that is complete, adequate, according to specifications so that it can run effectively; (3) Review and adaptation of the curriculum as a guide for implementing research-based digital learning; (4) Strengthening the internet network with high and smooth bandwidth specifications; (5) The development of a dynamic research culture and atmosphere at PT; (6) Knowledge and competence of lecturers in utilizing ICT (digital) in carrying out mini research-based learning for students;

2. Discussion

The learning trend in the industrial revolution 4.0 era leads to research-based digital learning. The use of ICT is a must in learning, especially during the Covid-19 pandemic. Digital learning can cross time and place in learning interactions. The formulation of research-based digital learning concepts gave birth to Semester Learning Plans (RPS). The learning design is carried out in consultation with education experts, educational technology experts, and research experts. Furthermore, FGDs were conducted to absorb aspirations, ideas, and proposals for the design of research-based digital learning devices. Then the product trial was carried out while getting responses and responses from students after the product trial was carried out. The three activities were carried out to obtain a research-based digital learning device design in the form of RPS. The following is a description of the RPS developed in the tested courses, namely: (1) Name of study program, name and course code, semester, credits, name of supporting lecturer; (2) Graduate learning outcomes charged to courses; (3) The final capabilities planned at each learning stage to meet graduate learning outcomes; (4) Study materials related to the capabilities to be achieved; (5) learning methods; (6) the time provided to achieve the ability at each stage of learning; (7) Student learning experience embodied in the description of tasks that

must be done by students for one semester; (8) Criteria, indicators, and assessment weights;

Graduate learning outcomes (CPL) of the Study Program reduce CPMK, namely Course Learning Outcomes. The CPMK formulation must contain elements of ability and learning materials that are selected and the level of depth and breadth is determined in accordance with the CPL imposed on the course. After CPMK is formulated, Sub-CPMK is formulated as a final ability formulation that is planned at each learning stage that is specific and measurable, and demonstrated at the end of the learning process. A good Sub-CPMK has the following indicators: (1) Specific, ie the formulation must be clear, using specific terms describing abilities: desired attitudes, knowledge, and skills, using concrete action verbs; (2) Measurable, namely the formulation must have a target student learning outcomes that can be measured, so that it can be determined when it can be achieved by students; (3) Achievable, namely the formulation stating the abilities that can be achieved by students; (4) Realistic, namely the formulation stating realistic abilities to be achieved by students; and (5) Time-bound,

Additional competencies are the ability to conduct mini-research, the ability to search for digital literature, design digital teaching materials, assessment tools, compile mini-research reports, search for journals of national or international repute, and submit or publish research results. The formulation and design of teaching materials is adjusted to CPL and CPMK. Study materials can come from various branches/branches/parts of the scientific field or areas of expertise developed by the study program. Learning materials can be presented in the form of textbooks, teaching modules, dictation, practical instructions, tutorial modules, reference books, monographs, podcasts, videos, and other equivalent forms of learning resources ²⁴.

Systematics of materials or teaching materials in research-based digital learning, taken from the example of the Education Management Course, include: (1) Lecture contracts: brainstorming/lecture contracts, orientation, attendance,

²⁴ Aris Junaidi, "Panduan penyusunan kurikulum pendidikan tinggi di era industri 4.0 untuk mendukung merdeka belajar-kampus merdeka," 2020.

and motivation; (2) Introduction to the Education management paradigm; (3) Introduction to research methods and techniques for preparing research reports; (4) Exploration of the latest research related to teaching materials/courses/browsing reference links; (5) School-based management (SBM) in kindergarten (group research and presentation 1); (6) Education curriculum management in Kindergarten (research and presentation of group 2); (7) Management of students in kindergarten (research and presentation of group 3); (8) Management of educators and education staff (research and presentation of group 4); (9) Management of facilities and infrastructure (Sarpras) Education in kindergarten (research and presentation of group 5); (10) Educational financial management in Kindergarten (research and presentation of group 6); (11) Kindergarten relationship management that is fostered with the community (research and presentation of group 7); (12) Educational Leadership in Kindergarten (research and presentation of group 8); (13) Education Supervision in Kindergarten (research and presentation of group 9); and (14) Review of submitted manuscripts.

Research-based digital teaching materials in courses are adjusted to the aspects of ease of design, practicality, capability, and eligibility. The types of digital teaching materials can be seen in the aspects of text teaching materials, presentation teaching materials, and video teaching materials (electronic, print, graphic, and realia media). Examples of digital teaching materials that can be used in presentations are Prezi, Presenter'13, Quizmaker'13, Engage'13, Replay'13 and others. Digital teaching materials are designed based on mini research results that are stored in the cloud, and can be accessed if needed. Learning experiences in research-based digital learning, including approaches, strategies, and methods. The research-based digital learning approach can be seen from the aspect student-centered learning (student of centered); self-determined learning; research-based learning (research), and digital-based learning. The learning media applied is based on MOOC (Massive Online Open Course) with the elaboration of the academic information system (Siakad) and the Digital Learning Management System (LMS) platform, namely Edlink, Zoom, and Video.

Research-based digital learning strategies include *Contextual teaching and learning*, *Active learning*, *Problem based learning*, and *Cooperative learning*. Furthermore, research-based digital learning methods include the lecture method; Assignment method; Travel Method Method, Percentage Method; Demonstration method, discussion method; and method of inquiry. The evaluation design in research-based digital learning is determined by the criteria, weights, indicators, and application of the assessment tools used. Assessment indicators with weights include attendance (10%), attitude/character (10%), scientific work (10%), responsibility (15%), publications in journals (10%), UTS (20%), and UAS (25 %). Sub-assessment with indicators is found in the RPS Attachment. Assessment tools applications that can be applied to research-based digital learning include Kahot, Google Cloud Platform, Quizizz, Quiz Creator, Pro Profs, Survey Monkey, and Quiz Maker.

The development of theory and legitimacy of argumentation requires digital-based literature, both in the form of books, journals, proceedings, and other scientific manuscripts. Recommended book references published at least the last 10 years. The recommended reference links are the IAIN Parepare repository, Garuda Reference Digital, Morareg Kemenag, Science Direct, Taylor Francis Online, Springer Open Journal, Sci-Hub, Journal of Scientific Exploration, JSTOR, JurnalTOCs, Dergi Park, Caltech Library, International Knowledge Sharing Platform , and Elseiver

D. Conclusion

The trend of research-based digital learning in universities in the era of the industrial revolution 4.0 is getting stronger and becomes a necessity. ICT acceleration has implications for the transformation of research-based digital learning. The blended learning system has become a new instruction and tradition, especially during the Covid-19 pandemic, which requires social distancing. The trend of digital learning is towards online learning, with the use of LMS. Utilization of digital in learning, such as digital books, presentations, videos, assessment tools, and access to digital literature. Learning competencies in the industrial revolution

4.0 era, namely the realization of critical thinking, creative thinking, communication, and collaborative, this emphasizes the urgency of research-based digital learning.

Research-based digital learning design in the industrial revolution era starts from philosophical, normative, and historical foundations, supported by digital and research-based curricula, reflected in the profiles of study program graduates, lowering CPL, translation into CPMK, down again in Sub-CPMK for the theme each course meeting. Prepared teaching materials using digital literacy and developed through research, which includes introductory course materials, introduction to research methodology and report preparation, introduction to digital literacy and references, and publication of manuscripts in reputable online journals. A research-based digital learning experience using a Student Center Learning (SCL) approach and is based on independence. Learning media uses LMS such as Sevima and Edlink which are supported by the Zoom application, Google Meeting, videos, and more. Research-based digital learning strategies are contextual-based, active, problem solving, inquiry, and cooperative. The learning method used is lecture, assignment, presentation, discussion, and inquiry. Aspects of assignment-based learning evaluation (assignments), namely attendance (10%), attitude/character (10%), scientific work (10%), responsibility (15%), publication in journals (10%), UTS (20%) , and UAS (25%). Description of tasks such as making papers, presentation materials (power point or video), and other tasks. Aspects of assignment-based learning evaluation (assignments), namely attendance (10%), attitude/character (10%), scientific work (10%), responsibility (15%), publication in journals (10%), UTS (20%) , and UAS (25%). Description of tasks such as making papers, presentation materials (power point or video), and other tasks. Aspects of assignment-based learning evaluation (assignments), namely attendance (10%), attitude/character (10%), scientific work (10%), responsibility (15%), publication in journals (10%), UTS (20%) , and UAS (25%). Description of tasks such as making papers, presentation materials (power point or video), and other tasks.

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