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Knowledge Capture in the Field of Curriculum Development in the Format of Digital Media

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ABSTRACT

With the massive flow of information obtained easily today, knowledge is one of the essential assets that must be maintained in an organization. In this digital era, books are not the only source that can be used as an asset. There are so many media applied to spread the knowledge held by experts in higher education. This study aims to document each lecturer's knowledge (knowledge capture), especially lecturers who have curriculum development expertise, to preserve their knowledge to be used by all students and even the broader community in the future online. The research used the descriptive method. The subjects are curriculum expert lecturers, learning media expert lecturers, students, and education practitioners. Based on the research results in conducting a needs analysis, data obtained that in the context of knowledge transfer in an organization or scientific field, the knowledge capture process becomes an essential part of storing knowledge in the long term. The steps taken to manage knowledge well need to be carried out through stages 1) identifying and collecting knowledge, 2) capturing and storing knowledge, 3) transferring and sharing knowledge, 4) creating a knowledge portal, and forming a dedicated team in maintaining the knowledge store.

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1. INTRODUCTION

Knowledge has been accumulated in every community, institution, company, educational institution, even in isolated tribal circles. In local communities, it is known as local wisdom, which is a collection of knowledge used to maintain the life of the local community (Darmadi, 2018; Kartika, 2016; Rochgiyanti & Susanto, 2017). Their knowledge can be observed from the ideas, activities, and artefacts they maintain. It is acquired from generation to generation, disseminated non-formally, and stored in the form of myths, fairy tales, stories, norms, and cults at the head of a custom (Agarwal 2017). External parties use local wisdom to facilitate knowledge management in research on local community subjects. Local wisdom that researchers can describe carefully can be used as a collection of knowledge that is local genius.

In knowledge management, it is divided into three types, namely tacit, implicit, and explicit. Tacit knowledge is the knowledge possessed by someone who has certain "flying hours" so that it is not only theoretically calculative, but it has become an inseparable part of him. Capturing tacit knowledge is very difficult to do, whether it is written, described, or articulated (Goffin, Koners, Baxter, & Van der Hoven, 2010 ; Kingston, 2011; Panahi, Watson & Partridge, 2013).

The most appropriate example of tacit, for instance, is how to cook following recipes from grandmothers or parents. Even though it was by the recipe, the taste was not the same as the results cooked by grandmother. A chef who has worked for many years is a company's asset in a restaurant or hotel business. It is hoped that his knowledge and "feelings" have been transferred to the next generation before getting retired.

Tacit knowledge is formed based on his knowledge and experience stored in his brain. Usually, this knowledge is not structured, so it tends to be irregular when it is delivered. This tacit knowledge is obtained more from various experiences he has experienced, not only from formal learning, so sometimes there is information that cannot be conveyed verbally because it is difficult to express (Addis 2016; Rohmiyati 2019; Walker 2017). Furthermore, tacit knowledge is more personal and is developed through experiences that are difficult to formulate and communicate. It is influenced by educational factors (schools and training), organizational experience, and experience associating with various people/friends (Marschark, Shaver, Nagle, & Newman, 2015; Rohmiyati, 2019). These three factors form a person's tacit knowledge. It is hoped that the knowledge capture process and general knowledge obtained can also be obtained from special knowledge (tacit knowledge) owned by experts.

Implicit knowledge is the knowledge that is similar to tacit knowledge. And some experts equates tacit with implicit knowledge (Smith in Herbig & Müller, 2014). However, between tacit and implicit. According to Nickols, implicit knowledge can still be observed in approaches, methods, and actions. Implicit knowledge can be articulated, while tacit cannot be expressed (Davies, 2015). The more visible knowledge is explicit, namely academic, concrete, and can be realized in books, copyrights, patents, or other expressions. Explicit knowledge is codified, stored in databases and shared through print, electronic media, and can be taught through formal education.

In the educational environment, especially at the tertiary level, efforts to record or capture knowledge still "attached" to every expert need to be carried out. Scientists are assets of universities that are assets of a nation whose knowledge needs to be maintained. Recording explicit knowledge may be easier because it can be calculated from the theme and number of articles, titles of books published, and recorded conversations at each scientific meeting.

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However, the recording of implicit and tacit knowledge needs to use more systematic methods and approaches.

This study tries to propose a theoretical approach to capture knowledge digitally. The proposed model is limited because the test is only carried out on a community of lecturers who have expertise in Curriculum Development. The perception of the research subjects is still limited, but it is sufficient to provide an overview of the opinions of the internal community. This study aims to develop a knowledge capture model in a university environment based on digital media. The expected benefit of this research is to obtain a knowledge capture approach so that students and the wider community receive the correct information to develop the knowledge they are interested in. The data from the experts is undoubtedly one of the characteristics that the data is close to the truth.

For this reason, media is needed to document and share this knowledge with the public. The treasures of knowledge possessed by experts can be appropriately stored and can be easily obtained anytime, anywhere, even if the expert is no longer active. The knowledge possessed can still be obtained in the long term.

Knowledge capture is extracting knowledge and experience from an expert (Anagnostakis et al., 2016). Recording the knowledge attached to someone is not an easy thing because it will take time. In addition, appropriate methods and techniques are needed to ensure the truth of the knowledge recorded.

Knowledge capture is carried out to maintain and manage the knowledge owned by a person, so it is straightforward to be internalized to the next generation and distributed to people in need. This knowledge capture needs to be done to support the survival of an organization that can increase its competitive advantage (Ferreira, Fernandes, Guo & Rammal, 2022). The knowledge that can be taken is the amount of knowledge possessed by individuals who work in a field and are experts in their fields. His knowledge and skills are very much needed to support the improvement of performance in the future. As a method, knowledge capture is the recording of intellectual assets, which is undoubtedly very valuable and will benefit the institution if stored properly (Haradhan,2016).

Knowledge capture can be done in various ways, including interviews with those who have this knowledge (experts), on-site observation, consensus decision making, nominal group technique, Delphi method, repertory grid, concept mapping, and blackboarding (Lockwood, Burge as cited in Anagnostakis, 2016). Another thing that can be done to do knowledge capture is through a Technology-Based System and softer system (Agustini & Wahyudi, 2015). A technology-based system is a system that utilizes and optimizes the use of information technology such as collaborative wiki, where everyone can add and change existing information so that the data is always up to date (Turban as cited in Papa, Santoro, Tirabeni, & Monge, 2018). In comparison, the softer system implements Knowledge Management with a specific action or meeting method where everyone can relate to and exchange information.

Traditionally, knowledge capture has emphasized the role of individuals in gathering information and creating new knowledge. The literature does not reflect a consensus regarding the part of the individual in knowledge acquisition. Some authors believe that each company has its entity of learning experiences (Nelson & Winter as cited in Constantiou & Kallinikos, 2015). On the other hand, organizations can acquire knowledge and learn because learners are only individuals in the company (Dodgson as cited in Nugroho, 2018).

In Knowledge Management, the creation or capture of knowledge (knowledge creation or capture) can be done by individuals who work for the organization or groups, a community of practice (CoP) or dedicated individual CoPs (Bolisani & Scarso, 2014; Khalili, 2018). This is done personally, as almost everyone does some knowledge creation, capture, and codification

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activities in carrying out their work. Within companies, individuals share perceptions of and jointly interpret information, events, and experiences. At some point, knowledge acquisition transcends individuals and is encoded into corporate memory (Laperrière & Spence, 2015; Spraggon & Bodolica, 2017; Nonaka & Takeuchi as cited in Twum-Darko & Harker, 2015). Unless knowledge is embedded in the company's memory, the company cannot take advantage of the knowledge possessed by each of its employees. Organizational knowledge acquisition is the articulation of personal knowledge at the company level, which is internalized into the company's knowledge base (Del Giudice & Della Peruta, 2016; Spender as cited in Feller, Parhankangas, Smeds, & Jaatinen, 2013).

Many tacit knowledge capture techniques derive from techniques initially used in artificial intelligence, specifically in developing expert systems. Expert systems incorporate knowledge gathered from experts and are designed to perform as performed by experts. The developers of such systems coined the term knowledge acquisition to refer to various techniques such as structured interviews, protocol or talk analysis, questionnaires, surveys, observations, and simulations. Some authors even use the term digital cloning. Knowledge management in business settings is concerned with capturing knowledge, looking for ways to make tacit knowledge explicit through documentation or creating expert directories to encourage knowledge-sharing through human collaboration (Asrar-ul-Haq & Anwar, 2016; Herbst, 2017; Small & Sage, 2005; Smith as cited in Wang, Wang & Liang, 2014).

The benefit of knowledge capture is, of course, it can store the knowledge and skills needed to be developed further and to avoid losing track. The time that should have been used for development was used up for retrieval. In the tradition of article writing, it is often obligatory to cite findings from the last five years to preserve knowledge. If knowledge capture is carried out correctly and following the procedures, the required knowledge can be captured and stored correctly (Anagnostakis et al., 2016; Delugach, Etzkorn, Carpenter, & Utley, 2016; Johnson Fletcher, Baker, & Charles, 2019).

Knowledge of curriculum development is required in various educational and training institutions. The curriculum in the education system has a vital role. The curriculum directs all forms of learning activities to achieve academic goals. The curriculum becomes a guideline and handles the type, scope, sequence of content, and learning process. Implementing the teaching and learning process will occur well if there is a curriculum; otherwise, it will not go well if there is no curriculum as a reference.

The notion of the curriculum continues to develop along with the development of educational theory and practice. The curriculum is divided into five types of dimensions, namely: a) curriculum as an idea; b) curriculum as a plan; c) curriculum as a result achieved, and d) curriculum as implementation, e) curriculum as a learning experience for students (McNeil, 2006).

In the development process, the curriculum needs to have a strong foundation. Using an appropriate and robust foundation in developing the curriculum is not only required by curriculum makers at the central level (macro). Still, it primarily must be understood and used as a basis for consideration by curriculum developers at the operational level (education units), namely teachers, principals, supervisors. Education (supervisor) school board or education committee and teachers and other related parties (stakeholders). The foundations used in developing the curriculum include philosophical, psychological, sociological, and scientific and technological foundations (Alsubaie, 2016; Crompton, Bernacki & Greene, 2020).

The curriculum is a system that has specific components. These components are related; if one part is damaged or disturbed, further details will also be damaged or concerned. This

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means that if one feature does not work as expected, it will affect the working process of the other components. Termed the curriculum component with the anatomy of the curriculum. The anatomy of the curriculum consists of goals (aims, goals, and objectives), content, learning activities, and evaluation (Zais as cited in Nkyabonaki, 2013). The curriculum components are a unity that influences each other and have the same role in achieving educational goals (Alshumaimeri, 2022; Bachman, Pettit, & Rosenbaum, 2022).

Although it has the same pattern, the curriculum development process in a particular institution does not have the same practice in other places. Curriculum development activities are very distinctive, different from one another. Each institution has its own experience, which includes explicit, implicit, and tacit knowledge. At the individual level, understanding of the theory and practice of curriculum development is also very distinctive. This statement can be tested, and for example, an educational institution presents two experts or curriculum development experts. Both were given the task (separately, not meeting each other) to develop a curriculum model applied to the institution. Researchers can ensure that the models and strategies developed at these institutions will be different. Decision making to develop curricula is the knowledge that deserves to be recorded (knowledge capture).

Knowledge of "explicit" curriculum development normatively has been stored well in various references. Tyler's proposes an Objectives Model in curriculum development, which is divided into four stages, namely (1) Stating the goals and objectives of the program based on their respective educational philosophies, (2) Selecting content or subject matter to help students achieve their goals; (3) Decide on the method for organizing and presenting the content, and (4) Decide on the method for measuring the extent to which the objectives are achieved. Elsewhere, it may also follow Richards (2001)'s opinion that presents the five stages of the curriculum development process, namely (1) needs analysis; (2) Setting goals and objectives; (3) Subject organization; (4 Select and prepare teaching materials; and (5) Evaluation. Experts in curriculum development study programs can group themselves in certain areas of expertise according to the stages of curriculum development. Evidence shown is in articles, books, proceedings, and other evidence whose frequency is most in a certain period.

The "implicit" knowledge possessed by experts in the context of curriculum development is all modifications or adjustments between theory and practice, decision-making procedures in each development stage, and work products in curriculum development activities at specific institutions. Meanwhile, the tacit knowledge that can be recorded from the expert is his attitude and leadership in curriculum development.

2. METHODOLOGY

The research used the descriptive method. The subjects are curriculum expert lecturers, learning media expert lecturers, students, and education practitioners. The total number of research subjects was 33 people—data collection techniques through interviews and filling out questionnaires based on the google form application. The questions posed to the lecturers are about the fields of science that are specifically developed as the identity of their expertise. The list of questions asked to other subjects is about the area of work, length of time in studying related sciences, academic qualifications, perceptions of competencies that need to be improved in the field of curriculum development, efforts to increase competence in the field of curriculum development, reading resources, and topics or themes which will be the area of expertise. The data analysis used is quantitative with presentation techniques.

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3. RESULT AND DISCUSSION

In the context of knowledge transfer in an organization or scientific field, the knowledge capture process is an early stage that must be adequately managed. Knowledge transfer has five steps.

Step 1: Identify and gather knowledge. The gathering process can be done by brainstorming, learning new skills, inviting experts or consultants, finding solutions to problems, and designing new projects. The resulting knowledge is still intangible but ready to be documented and shared with your team. In the tradition of corporate organizations, systematic activities can be added, namely:

1. Describe institutional problems and find solutions
2. Documenting the solution
3. Seek input from team members and outsiders
4. Encourage collaboration and teamwork
5. Presenting mentors or mentors and coaching staff
6. Train and develop staff

Step 2 is capturing and storing knowledge. In the documentation process, it's not just about accumulating knowledge in Google Drive files and folders. However, an infrastructure that makes it easy to gain access to knowledge is needed quickly and easily. The infrastructure that is possible to provide is (1) research reports, (2) storage in the form of visuals or videos, (3) storing in document libraries, (4) creating knowledge portals, Customer Relationship Management (CRM) systems built between institutions and stakeholders. Stakeholders; (5) establish a dedicated team in maintaining knowledge storage.

Step 3 is the transfer and sharing of knowledge. After having knowledge and having a system for collection, then disseminate the information to others. The knowledge transfer process will be more efficient and more accessible if the right technology is used. Communication facilities (such as WA groups) that facilitate collaboration and communication. A person or persons who are dedicated to circulating knowledge to each appropriate person. The most pertinent example, which is developing in Indonesia, is the https://www.halodoc.com/ application.

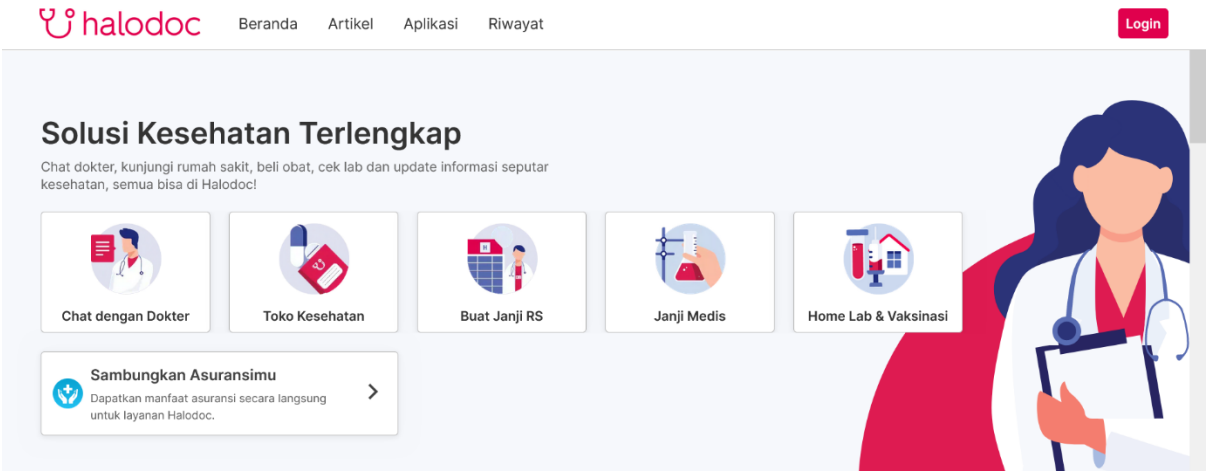

Figure 1. halodoc.com Application

Step 4 is to apply knowledge and measure results. The most appropriate way is to define knowledge management by formulating success in several key performance indicators. An application similar to the startup Pipedrive is needed at this stage, which provides software

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to connect sellers and buyers and transportation services. Pipedrive can log phone calls, emails, chats so that this historical data can be acted upon. Information managers can track thousands of calls and simultaneously view sales statistics—examples of Pipedrive applications such as gofood or shopee-food.

Step 5 is to create new knowledge, using stored knowledge to "produce" new ideas, technologies, or solutions that produce more effective results. Everyone applies this idea to other, broader areas. In this way, the academic environment will be encouraged to develop knowledge continuously.

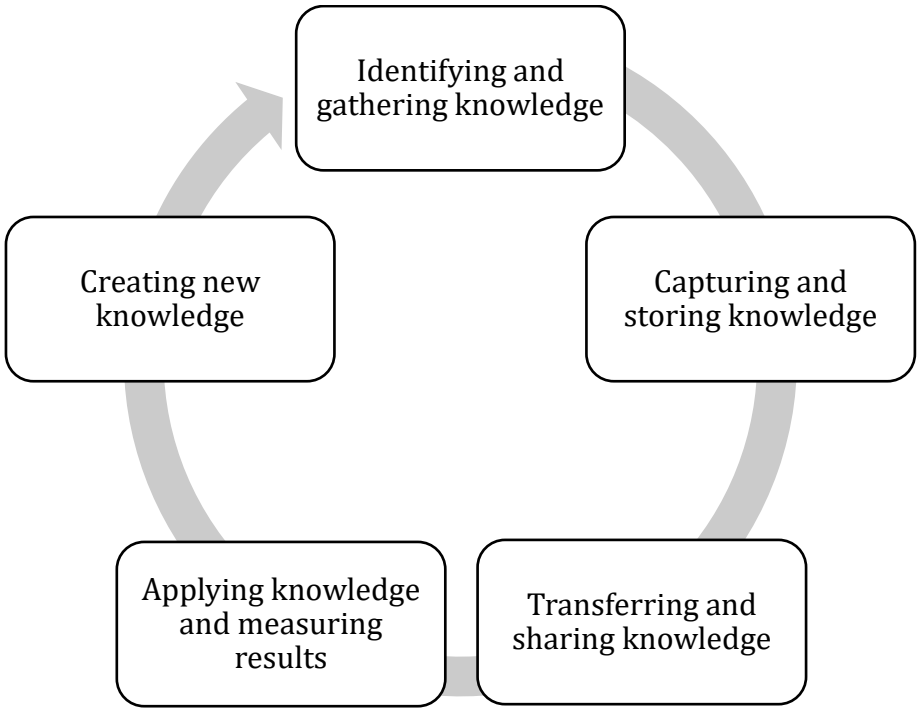

Figure 2. Knowledge Management Steps

Based on the cycle of Figure 1 above, the study results extracted a number of information, namely identifying knowledge needs related to curriculum development. The data is already grouped, so it's leaner.

Table 1. Identification of Needs Based on User Perceptions of Knowledge from the Curriculum Developer Community

No	Theme	Needs of Identification
1	Curriculum Design	1. Design of needs analysis, model and curriculum design. 2. Blended Learning Design for Early Childhood Education 3. Curriculum Design in the 3T Region 4. Education and training curriculum design 5. Design a multicultural Indonesian curriculum 6. Outcome-Based Education Design

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		7. Development of an independent campus curriculum for study programs (universities) Digital curriculum design 8. Practice making curriculum based on curriculum design models (subject-centred design, learned centred design, problem-centred design)
2	Curriculum implementation	1. Blended Learning/Hybrid Learning 2. Implementation of curriculum diversification 3. Implementation of Cross-Sectoral Curriculum in the Context of the Era of Disruption 4. OBE curriculum implementation 5. Implementation of 2013 Curriculum and PSP 6. Adaptive Curriculum towards 5.0. era 7. Locally based curriculum 8. Curriculum in the digital era 9. Independent Learning Curriculum for Student Well Being 10. Independent Learning Curriculum management model 11. Curriculum Modification, Curriculum Adoption & Adaptation 12. Implementation of the independent campus curriculum. 13. Development of a digital portfolio assessment-based curriculum
3	Curriculum Evaluation	1. 2013 Curriculum Evaluation 2. Evaluation of ICT-based curriculum 3. Evaluation of the OBE curriculum 4. ECD Curriculum Evaluation 5. Macro and Micro Evaluation of Curriculum 6. Evaluation of Education Units in schools 7. Evaluation of the selection of essential materials at the high school level with the linearity of needs at the University 8. Curriculum Evaluation Model 9. Multidimensional curriculum evaluation model for universities 10. Use of technology in evaluating curriculum 11. Supervision and assessment of the quality of curriculum implementation, 12. Curriculum evaluation practice using various curriculum evaluation models
4	Curriculum Management	1. Curriculum management Oriented to learning outcomes and diversity 2. Implementation of flexible curriculum 3. The implications of the policy of independent learning with curriculum management 4. Environment-based curriculum 5. Curriculum Management in Military Education

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		6. Technology-Based Actual and Integrated Curriculum Management 7. Boarding school curriculum management 8. Curriculum Management in Vocational Schools 9. Curriculum Monitoring and Evaluation Management 10. Digital Curriculum Management 11. The practice of managing a school or college using the principles of curriculum management 12. Transformative curriculum management
5	Micro Curriculum	1. Implementation of local content curriculum 2. Local wisdom curriculum 3. Independent Micro Curriculum Learning 4. Utilization of the Micro Curriculum as a foothold for independent learning 5. Hybrid learning through structured and independent tasks 6. Curriculum development in blended learning for elementary school students 7. Practice creating micro-level curriculum 8. The practice of comparing the micro curriculum between subjects, the practice of comparing the curriculum between education units (differentiate the levels from PAUD-PT to the training curriculum)

Techniques for capturing and storing knowledge. Research subjects view a number of techniques that are considered appropriate, which can be seen in the following table:

Table 2. Recommended Knowledge Capture Techniques

No	Knowledge Capture Technique	Form of Video		Form of Podcast	
		Total	**%**	**Total**	**%**
1	Monologue	1	3%	4	12%
2	Storytelling	8	23%	5	15%
3	Interview	2	6%	11	32%
4	discussion	16	47%	13	38%
5	Teaching in class	6	18%	-	-
6	All	1	3%	1	3%
	Total	**34**	**100%**	**34**	**100%**

Apart from being in videos and podcasts, the subject also suggested that motion graphics be made to serve certain circles. The number that meant there were 31 people (91%), the rest did not agree. There are also suggestions in questionnaires, e-books, professional curricula, and visual texts in a limited number.

For the next step, the technique of sharing knowledge, measuring results, and creating new knowledge has not been explored. However, the requirements for completeness of the system are already available, namely the availability of knowledge sources in the form of explicit, implicit, or tacit form.

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Table 3. Sources of Knowledge in Curriculum Development Study Programs in Indonesia

No	Theme	Knowledge Source (explicit, implicit, and tacit)
1	Curriculum Design	Prof. Dr. Mohammad Ali, MA. Dr. Bachtiar Bachri, M.Pd Prof. Dr. Dinn Wahyudin, M.A Prof. Dr. Titik Harsiati, M.Pd Prof. Dr. Anik Ghufron, M.Pd. Prof. Dr. Deni Darmawan, M.Si., MCE.
2	Curriculum implementation	Dr. Uwes Chaeruman, M.Pd. Dr. Cepy Riyana, M.Pd. Dr. Rusman, M.Pd. Dr. Diah Latifah, M. Pd Prof Muchlas Samani Prof. Dr. Haris Mujiman
3	Curriculum Evaluation	Prof. Dr. Hamid Hasan, M.A. Dr. Zainal Arifin Prof. Dr. Mustadji, M.Pd.
4	Curriculum Management	Prof. Dr. Mohammad Ali, MA. Prof. Dr. Dinn Wahyudin, M.A Prof. Dr. Safari Dr, Bachtiar S. Bachri Dr. Rudi Susilana, MSI.
5	Micro Curriculum	Prof. Dr. Mohammad Ali, MA. Prof. Dr. Mustaji, M.Pd. Prof. Dr. Luthfiah, M.Pd. Dr. Rudi Susilana, M.Pd. Dr. Laksmi Dewi, M.Pd. Dr. Ariantoni

The potential availability of digital media in capturing and managing knowledge is adequate in the era of industrial revolution 4.0. Factors that need to be further developed are the process of knowledge transfer and knowledge management. These two things are instrumental in digitizing knowledge, but more than that, it is necessary to create a culture in developing knowledge management. There are a number of supporting cultures that need to be developed in developing management knowledge:

1. Record knowledge independently by each source of knowledge, in this case, are lecturers and other practitioners. The forms are diverse, ranging from books, articles, papers, small notes, and others. From all recordings, it is expected to have more specific expertise to declare himself an expert in a particular field at a particular time. The specification of expertise does not entirely mean monodisciplinary; the meaning of particular knowledge here is "responsible" for the knowledge studied in depth. Thus, his knowledge is not limited to explicit and implicit but has reached the peak of his tacit knowledge. Table 3 shows the user's perception of the resource person. The facts of explicit knowledge have not supported the data. There has been no "recognition" from the sources of the knowledge that will be responsible for the development process.

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2. Knowledge management has not been taken seriously. The culture referred to here is in reconstructing knowledge as a wealth of study programs. The knowledge possessed is still scattered in the form of theses, dissertations, articles and is still in the minds of the informants. Call it the knowledge that is still "settling" on Prof. Dr. Mohammad Ali, M.A. and Prof. Dr. Hamid Hassan, MA., and not everything has been recorded even though he has written many books and articles. Still, his implicit and tacit knowledge has not been internationalized to those who need his knowledge.
3. The culture of "perfuming" the knowledge that the study program already has is also still low. The cultural form of perfuming knowledge, for example, citing each source's writings in the internal environment. Why, the citations become indicators in determining Q in the indexing scope at SJR, basically to scent the wealth of knowledge? in the journal. This culture will be easily socialized if the first culture, namely the production of books, articles, and papers, is carried out sustainably.
4. The culture of partnership and collaboration culture is also still weak. However, from the data obtained, the UPI Curriculum Development Study Program has international level speakers. Institutionally it is also quite taken into account at the Southeast Asian regional level. However, it still needs to be developed from an ecosystem perspective by conducting more comprehensive collaboration.

4. CONCLUSION

The Curriculum Development Study Program has the equipment to develop knowledge management. In the early stages of this research, the study program can record (knowledge chapter). The infrastructure in building knowledge storage is adequate. The thing that has not been developed is a culture in maintaining knowledge. This fact implies that it takes a strong effort from all parties in the study program environment to design a way of managing knowledge so that it is more productive and becomes a study program that is taken into account both nationally and internationally.

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