

Teaching Laboratory in Developing Teacher Digital Literation

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Abstract—This paper focuses on the conceptualization developing digital literacy skills with laboratory. The learning of the 21st century brings digital literacy oriented to the theory and practice of teachers. This discourse is oriented in digital and teaching laboratory. Teachers resilient come from resilient college education and produce a resilient school. Teachers resilient need a strong school. This paper offers a clear and theoretical-grounded teaching laboratory for effective learning in a digital environment. An integrative framework for digital literacy as a starting point for much-needed teaching laboratory development. The two basic strategies are the first strategy of digital skills in teaching through a laboratory. The second strategy concerning the conceptualization of integrative laboratories can be reduced to tools of materials and work procedures. Discourses concerning tough school teachers, learning styles and multiple intelligences between modern, book-based digital culture and blended learning.

Keywords—teaching laboratory, digital literacy.

I. INTRODUCTION

The rapid development of digital technology presents individuals in a society with ever-growing situations and conditions. The development of the situation means adjustment to environmental change while the condition means a change in one's self to adjust. Troubleshooting in a digital environment requires skill. These skills are often referred to as "digital literacy" [1]; [2]; [3]. Digital literacy is presented as a mindset that allows users to easily, efficiently and effectively access knowledge in the environment [2]; [4]; [5]; [6]; [7]; [8].

Digital literacy involves more than the ability to use software or operate digital devices, including a wide range of complex cognitive, motor, sociological, and emotional skills that users need to function effectively in a digital environment. The tasks required in this context include, for example, reading the intuition of the graphical display in the user interface; using digital reproduction to create meaningful new material from existing ones; build knowledge from nonlinear; hypertextual navigation; evaluate the quality and validity of information, and have a mature and realistic understanding of the rules applicable in cyberspace. Newly emerging concepts of digital literacy can be used as a measure of the quality of learners working in the Digital environment, and provide scholars and developers with a more effective way of communication in designing better user-oriented environments.

Stein and Graham in [9] describes six significant changes to the growth of Internet technology, including:

- 1) Analog to digital. Information, media, interaction, and experience are done online.
- 2) Wireless network. laptops, smartphones, and tablets allow people to access the digital world anywhere and anytime.
- 3) Isolated to connect. We can connect people around the world that we want according to their interests, professional connections and exponential growth.
- 4) Generic for personal. We are no longer satisfied with one piece of news, one information stream, or one community. We can choose our own experiences, and pass it on.
- 5) Consume to create. The modern web makes and participates as easy as consuming - YouTube and Flickr provide it space for everyone to share their own videos and photos. Blogs provide space to write and display their work. Wikipedia is the largest encyclopedia in the world because of the volunteers from all over the world.
- 6) Closed to open. The web is getting more open about who and what to do to find and develop connections. Sharing on the Web is also the norm, where individuals recognize the value of contributing their efforts to either information or ideas.

Teachers levels are positively and negatively correlated with the influence of school cultures, especially trust collegiality and leadership that affect whether teachers live or leave. For example: (i) student attendance and behavior problems [10]; (ii) continuous professional development and development of learning capacities at schools and outside schools that link individual and organizational needs [10]; and (iii) leadership roles. Schools that focus on building teacher and organizational resilience have academic optimism, professionalism, learning and professional development that are powerful. Resilient is not a psychological trait but a dynamic capacity that is influenced by socio-cultural factors, and resilient capacity can grow or be eroded by this. The quality of teacher toughness leads them to work for better teaching practices' [10].

Tough is an unstable construct [10] involving psychological, behavioral and cognitive (academic or professional) functions as well as emotional regulation [10] in various personal, relational and organizational settings. The idea of tough comes from the psychiatric discipline and developmental psychology of the attention of personal characteristics or characteristics to adapt positively and develop.

Digital Literacy as a combination of engineering and procedure skills, cognitive and emotional social. The use of procedural skills such as searching, storing, saving files,

retrieving and editing becomes more useful. Cognitive skills such as the ability to decipher or read messages in the use of graphics. Effective communication in the digital world can be understood as the social and emotional needs of its readers. Cannot be denied again in the world of work there must be computer and internet devices. Both become the basic needs in various fields including the field of education. The all-digital work environment at the level of education and teaching continues to grow with certainty. The national exam also uses digital. Thus, digital literacy has been understood as a skill for survival. Digital literacy becomes the key that helps the user perform complex digital tasks effectively in 21st century education.

The above description is a summary of the various concepts of digital literacy. In recent years digital literacy has described and conceptualized the skills users use in the digital environment [11]; [12]; [13]. Unfortunately, these efforts are local, focused on the skills chosen, and often limited to information retrieval [14]; therefore, they do not provide how to obtain digital skills in education from the scope of digital literacy.

This paper offers the concept of our understanding of "digital literacy" and its relationship to the laboratory. This concept provides professionals, digital environment designers, and educators to design teaching through a micro-level laboratory. The need for concepts in preparing teachers who are able to develop digital literacy in 21st Century learning is a necessity. The challenge of becoming a resilient teacher is "tough" becoming more complex. The skills to adapt the times are urgent. Advancement in research in positive psychology, neurology, business and organizational studies provides an important conceptual basis of Resilient in the workplace as a psychological and socio-cultural phenomenon. The nature of teachers is strongly influenced by psychological, emotional, behavioral and cognitive (academic or professional) functions in personal, relational and organizational settings. The quality of tough teachers is shaped by the social, intellectual cultural settings in which teachers work and live accordingly [10].

Tough is not the quality that the heroic people provide. Instead, it can be shared by many regular teachers who remain committed to serving exceptional learning and achievement of children and during their professional lives. The concept of Resilient life is how to build relationships with colleagues and students; and identify school leaders of trust, openness, collegiality and shared responsibility to grow and develop in schools. Teachers 'strong sense and effectiveness are measured by the progress of their students' academic results.

Digital communication has changed literacy practices and is assumed to be very important in workplace functions, recreation, and community contexts. Pedagogy in the context of normative learning literacy using new media. Recommendations are given to strengthen the relationship between New Literacy study research and literacy, assessment, and accountability in the 21st century [15].

Laboratory is an academic support unit of an educational institution, a closed or open space, permanent or mobile, systematically managed for limited testing, calibration and production activities, using equipment and materials based on

certain scientific methods, education, research, and community service [16]. The Tri dharma element of higher education and laboratory roles is more actualized than this definition.

There are 4 (four) kinds of laboratory that is,

- 1) Type I Laboratory is a basic science laboratory located at a secondary school level school, or a technical implementation unit that carries out education and training with facilities supporting equipment category 1 and 2, and the materials managed are general categories of materials to serve educational activities students.
- 2) Type II Laboratory is a basic science laboratory located at preparatory colleges (Semester I, II), or technical implementing units that provide education and training with facilities supporting equipment category 1 and 2, and the materials being managed are category materials general to serve student education activities.
- 3) Type III Laboratory is a scientific laboratory located in the department or study program, or technical implementing unit providing education and training with facilities supporting equipment category 1, 2, and 3, and the materials being managed are general and specific category materials for serving educational activities, and research students and lecturers.
- 4) Type IV Laboratory is an integrated laboratory located at a faculty or university study center, or a technical implementation unit that carries out education and training with facilities supporting equipment category 1, 2, and 3, and the materials being managed are general and special category materials to serve research activities, and community service, students and lecturers.

According to us if there is at the university ideally teaching laboratory of type 3 or 4. In addition to the wide scope is also able to potentially inter-study program because it is at least a faculty or university level. Equipment category 1,2,3 becomes an interesting discussion for ICT experts and teachers or lecturers. Equipment in digital literacy plays an important role in practice. For example, servers in the scope of a fast internet or scanners in the micro scope to convert analog to digital.

If there is in school then it is quite the type 1 with the scope that handles the realm of teaching in the classroom. Multimedia devices are a must in school. Teachers are able to interact with peers during the teaching. They are no longer "lonely" in teaching or at least reduce stress levels in the school environment of work. Interaction between teachers is more likely when all teachers are literate digital literacy.

There are two views in the utilization of teaching laboratory in developing digital literacy of teacher candidate that is conservative view and integrative view. According to the first view of literature on digital literacy should be an integral part of the work body on learning styles, multiple intelligences, or personality types. According to the latter is describing the transition of society from a book-based, rationalistic conservative culture to an audio-visual digital culture. The views on the use of teaching laboratory are conservative views and integrative views. The conservative view views the separate skills between the laboratory and the lecturer class. Separate analysis of their skills and the nature of classes with their laboratories, their mutual relationships,

and the resulting implications for educational and technological developments without the use of a mix of digital literacy theories and practices in a package of teacher-teaching skills. Prospective teachers need a structured and relatively long process.

The view of the first assumption underlies a conservative strategy that states that the digital literacy does not need to be raised or created separately in teaching. Digital skills have actually represented different learning styles [17], multiple intelligences by [18]. It is logically and empirically inappropriate to represent two different cultures. This is related to book-based digital culture as an epistemology and value different from digital literacy.

Researches in [5]; [6]; [7]; [8] propose a new conceptual for digital literacy to meet these requirements with practice-oriented. Practice in the world of higher education conducted by the laboratory. The paper is structured as a practical effort derived from the experience of handling Field Experience Practices at a faculty of education of educational colleges of education students, as well as the latest literature analysis on this issue. We believe that the results of this study include the kind of skills that are meaningful to prospective teachers while learning to teach effectively in a digital environment.

The second assumption is the literature that is oriented towards the integration of theory and practice in apprenticeship or practice of field experiences. This is in line with the school of Progressivism Education calling for the liberation of children from traditional ties that emphasize rote learning, reading, and textual authority [19]. This method has the following characteristics: Child centered as a learner rather than a lesson. Progressivism is student-centered education and gives greater emphasis on creativity, activity, naturalistic learning, real-world learning outcomes, and more "sharing experiences among peers. Emphasize on activities and experiences rather than knowledge and abilities.

The drive to form cooperative group learning patterns is not individual student competition. In other words, progressivism tends to use democratic methods that affect society and citizenship renewal. Integration with the existence of teaching laboratory.

A unit that is parallel to the department or course of study. Educational laboratories have a function as an academic support unit, service, and research. All three are applied in the internship program or Field Experience Practice. This paper is an attempt to develop a theoretical and practical framework in the realm of digital literacy by considering the main topic of forming a formidable teacher.

The tough teacher comes from a tough university. Prospective Teachers need a strong university as well. Laboratory units need to be optimized in support of quality teaching. Three main strategies using teaching laboratory to develop digital literacy in prospective teachers are through Internship I, Internship II, and Internship III.

Internship I serve as the initial discourse of discovery and deepening about the conditions in the field (real class) and reflection with the lecturers of teachers and lecturers. At this stage the role of teaching laboratory is as a catalyst and moderator of learning. School selection, preparation of materials and methods, timing and supporting administration become the main thing in apprenticeship I. Practitioners

(prospective teachers) see firsthand learning in the classroom as non-participant observers. Just take notes and reflect together in the focus group discussion of lecturers and teachers. Ideal ideal conditions and reality gaps become anecdotes in report writing of educational students following internships I. The depth of breadth and involvement of digital literacy becomes the main point in this reflection activity.

Internships II is a continuation of Apprentice I with the orientation of laboratory practice. The problem-solving design along with the existing skills in microteaching learning is done in this activity. Lecturers and labors collaborate to create digital literacy. Student practitioners practice teaching with peers with digital literacy skills in solving learning problems. Start searching, storing, filing files, recalling and converting data into something more useful.

Apprenticeship III is a field practice activity in real class. Teaching Laboratory acts as a moderator and a catalyst that technically includes the preparation of tools and materials, budget planning, instrumentation and guidebooks and assessments, bridges between teachers and lecturers, and value processors. Students practice teaching accompanied by teachers who previously received reflection materials with supervisors. The Learning Implementation Plan has been dissected with teachers and lecturers by emphasizing digital literacy as a real practice of reducing or solving learning problems. Learning problems can be limited space, time, media and funds. Selection of Blended Learning that emphasizes mixed learning. Blended learning can increase access to learning, foster comfort, and the occurrence of an effective learning experience. Students no longer have to come to college to attend the course. So that students who work or have a family can keep working or caring for their families. By moving more learning into blended learning it adds flexibility to participants' schedules, provides learning benefits through automated and asynchronous online tools, and can leverage modern social Web to help learning efforts beyond the reach of traditional class boundaries.

In Appendices II and III need to be emphasized about the media. Media is not a vehicle like a truck. Good media through theory review and empirical testing and through development research rules. Media will be able to improve student achievement. The media needs to be combined blended learning mix.

Blended learning in higher education is increasingly popular because it has high profits. Characteristics of students is adult learning (andragogy) which enables self-learning. Students can search for materials, follow the instructions of lecturers have been responsible for high in self-study. Face-to-face through "blends" can create a need for affective development and attitude. So, it is worth more popular blended learning in Higher Education. The "blended learning" model has mixed or mixed models. That is synchronous mixing with asynchronous. Flexibility to use both high flexibility and ease of "familiar" in usage.

Prototype teaching laboratory covers:

- 1) Design Sphere (e.g. Design Model, Approach, and Learning Strategy, Audio and cinematographic script design, Graphic design and animation);

- 2) Utilization Sphere (e.g.: learning resources :, media / learning materials);
- 3) Development Sphere (e.g.: E-learning, Learning Multimedia, cinematographic development, visual aids and simple media);
- 4) Management Sphere (e.g.: management of learning and learning resources);
5. Ranah Evaluation (e.g.: development and making of quality questions, making question banks, measurement and testing practice, making educational research instruments, data analysis and item analysis).

The rest of this paper is organized as follow: Section II describes proposed research method. Section III presents the obtained results and following by discussion in section IV. Finally, Section V concludes this work.

II. METHOD

The paper is structured as a practical effort derived from the experience of handling Field Experience Practices at an education faculty of higher education in Indonesia, as well as an analysis of recent literature on the subject. This paper is based on a literature review of Digital literacy and Resilient Teacher, Resilient Schools and laboratory-based education.

We believe that the results of this study include the kind of skills that are meaningful to prospective teachers while learning to teach effectively in a digital environment.

III. RESULTS

This paper relies on previous works, in which the fragmented literature on digital literacy is integrated into the teaching laboratory framework of the educational technology domain. Although this is the first step necessary to transform the emerging discourse, hitherto intuition-oriented practice, to a more productive, integrated, and theoretical practical theoretical discourse.

We dedicate this paper to make the first few steps necessary for expansion, and deepening. This step will ultimately guide us in the most basic policy decisions regarding education for the future. Digital literate education in 21st century learning.

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We have done so by showing a discussion of digital literacy. The first strategy is conservative. This strategy is based on the basic assumption of discourse that what is commonly called the "skill" of digital literacy. Skills in literacy then ask questions in the form of literacy skills. The second integrative strategy, based on the essential question of the above conservative assumptions. Teacher and literacy skills contain individual and cognitive personality. In this context, we raise five areas in optimizing teaching laboratory in improving the digital literacy

IV. DISCUSSION

It consists of research findings derived from literature review and field observations. These findings may be relevant to theories of educational technology, digital

literacy, resilient teachers and laboratory-based education (LBE).

While much has been written over the years about teacher stress and fatigue. Discussion so that teachers can maintain the commitment and effectiveness of their teaching professional lives. In the context of challenges and changes of the 21st century and educational research, psychological, socio-cultural and scientific research teachers in various schools argue that teachers' endurance is not only their ability to bounce back in very bad circumstances but also their capacity for daily resilience, enable them to maintain the commitment and effectiveness necessary to respond positively to the inevitable uncertainty inherent in their professional lives. The most effective way is to create a catalyst through a teaching laboratory in which there is a digital literacy skill.

The first strategy is conservative. This strategy is based on the basic assumption of discourse that what is commonly called the skill of digital literacy. Skills in literacy then ask questions in the form of literacy skills. How to find, how to save, how to manage, how to call back, and how to change it becomes more meaningful

The second integrative strategy, based on the essential question of the above conservative assumptions. Teacher and literacy skills contain individual and cognitive personality. In this context, we raise five areas in optimizing teaching laboratory in improving the digital literacy of prospective teachers which include:

- 1) Design Sphere (e.g.: Design Model, Approach, and Learning Strategy, Audio and cinematographic script design, Graphic design and animation);
- 2) Utilization Sphere (e.g.: learning resources :, media / learning materials);
- 3) Development Sphere (e.g.: E-learning, Learning Multimedia, cinematographic development, visual aids and simple media);
- 4) Management Sphere (e.g.: management of learning and learning resources);
- 5) Evaluation (e.g.: development and making of quality questions, making question banks, measurement and testing practice, making educational research instruments, data analysis and item analysis).

V. CONCLUSION

This paper has presented the conceptualization developing digital literacy skills with laboratory. The learning of the 21st century brings digital literacy oriented to the theory and practice of teachers. This discourse is oriented in digital and teaching laboratory. This paper has also offered a clear and theoretical-grounded teaching laboratory for effective learning in a digital environment.

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REFERENCES

- [1] Inoue, H., Naito, E., and Koshizuka, M. Mediacy: What it is? Where to go? *International Information & Library Review* 29 (3-4), 403-413. 1997
- [2] Gilster, P. *Digital Literacy*. New York: Wiley Computer Publishing. 1997.
- [3] Pool, C.R. A New Digital Literacy: A conversation with Paul Gilster. *Educational Leadership* 55 (3), 6-11. 1997.
- [4] Tapscott, D. *Growing Up Digital: The Rise of the Net Generation*. New York: McGraw-Hill. 1998.
- [5] Eshet-Alkalai, Y. Digital literacy: A Conceptual Framework for Survival Skills in The Digital Era. *Journal of Educational Multimedia and Hypermedia*, 13 (1): 93-106. 2004
- [6] Eshet-Alkalai and Amichai, H. Experiments with digital literacy. *Cyber Psychology*, 7 (4): 425-434. 2004
- [7] Eshet-Alkalai. Thinking skills in the digital era. In: Haward, C., Bottcher, J. V., Justice, L., Schenk, K., Rogers, P. L., Berg, G, A. (eds.) (2005). *Encyclopedia of Distance Learning*, Vol I. London, Idea Group Inc., (pp. 1840-1845). 2005.
- [8] Eshet, Y. and Chaiut, E. Living books: On the acquisition of digital skills in multimedia environments. Learning in the Technology Era. *Proceedings of the Chais Conference, The Open University of Israel, Raanana*, (pp. 15-25). 2005.
- [9] Stein, J., & Graham, C.R. *Essentials for blended learning: a standards-based guide*. New York: Routledge. 2014.
- [10] Day, C., & Gu, Q. *Resilient Teachers, Resilient Schools: Building and Sustaining Quality in Testing Times*. Routledge. 2013.
- [11] Burnett, K and McKinley, E.G. Modeling information seeking. *Interacting with Computers* 10, 285-302. 1998
- [12] Hargittai. Beyond logs and surveys: In-depth measures of people's web use skills. *Journal of the American Society for Information Science and Technology*, 53 (14), 1239-1244. 2002.
- [13] Wang, P., Hawk, W. B. and Tenopir, C. Users' interactions with World Wide Web resources: An exploratory study using a holistic approach. *Information Processing and Management*, 36, (2), 229-251. 2000.
- [14] Marchionini, G. Information-seeking strategies of novices using a full-text electronic encyclopedia. *Journal of the American Society for Information Science* 40 (1), 54-66. 1989.
- [15] Mills, K. A. A review of the "digital turn" in the new literacy studies. *Review of Educational Research*, 80(2), 246-271. 2010.
- [16] Peraturan Menteri Negara Pendayagunaan Aparatur Negara dan Reformasi Birokrasi Nomor 03 Tahun 2010 Tentang Jabatan Fungsional Pranata Laboratorium Pendidikan dan Angka Kreditnya.
- [17] Dunn, R. & Dunn, K. *Teaching Elementary Students Through Their Individual Learning Styles: Practical Approaches for Grades 3-6*. Allyn & Bacon: Boston. 1993
- [18] Gardner, H. *Frames of Mind: The Theory of Multiple Intelligences*. New York: Basic Books. 1993.
- [19] Gerald, L.G., *Philosophical Alternatives in Education*, Merrill. 1974.