Educational technologist competencies at school

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Abstract. Education is the answer to the changes and development of sciences and technologies. This research was conducted to strengthen and accelerate the effort to improve the education quality at school level. This research analyzed the need of educational technologist competencies to develop the applied model of the educational technologist developer as a functional career at school. Data collection was conducted by online survey to several teachers at junior high schools (SMP), senior high schools (SMA), and vocational schools (SMK) in Central Java and then being analyzed descriptively. The results identified at least four important basic educational technologist competencies to strengthen and accelerate the education quality at school, i.e. the process of quality assurance at school, the learning infrastructure development and management, the development of school educational human resources, and the development of applied educational technology to facilitate the teacher's basic obligation.

Keywords— Need Analysis; Competencies; Educational Technologist;

I. INTRODUCTION

Social change needs a good education quality as an important factor to improve the human resources and capacities so they are able to do something (power to), to build cooperation (power with), and to develop their inner power (power within) [12]. At this point education is directed to develop and improve the human capacity throughout their life so they contribute to their community and society. In this case, the term human capacity refers to the constellation of someone's knowledge, skills, attitudes, and behaviors in the form of independence, competitiveness, and resilience to the volatility of change.

Moreover, the school system should prepare and be ready to face the challenges of the 21st century as a knowledge age. Thy is why students should have several basic competencies as global citizens in the form of good communication skill, creative, critical thinkers, and collaborators, as well as mastering several official subject matters such as foreign languages, arts, geography, science and social sciences [10]. These competencies meet with the results of the National Research Council study which mention that cognitive competence in the form of critical and analytical thinking and problem solving are not the only key of success, on the contrary, according to the changes on economics, technology, and the 21st century social context, interpersonal and intrapersonal becomes the most important skills. In this case soft skills such as teamwork and leadership are highly appreciated by the employers [15].

On preparing the student to open up the opportunities to participate in the 21st century global community, teachers should prioritize to develop team-based, collaborative, and utilizing ICT learning models [14]. In other words, teachers should be able to develop a learning model which emphasizes the process of induction, a learning process which develops the strength and learning ability, not only acquires a number of knowledge, skills and attitudes, but more importantly is the development of metacognition, that is how knowledge, skills, and attitudes are gained [13]. Learning models developed by teachers should be able to ensure learners to have skills in learning and innovating, using technology and information media, and can work and survive by mastering a number of life skills.

Educational technology is the study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources [8]. Educational technology is an applied discipline of knowledge with a goal of improving learning, and performance. Educational technology as an applied discipline growing rapidly to meet the learning needs to learn more effective, efficient, broadly extensible, fast, and useful [7]. Educational technologists can contribute both theoretically and practically in improving the quality of learning by optimizing the effectiveness of teachers/lecturers on acquiring knowledge, also their readiness in learning practices, and improving the quality of lifelong learning skills for themselves [1].

Several researches on educational technology have been widely applied focusing on product or process. In terms of product, many studies proved that the product of technology

improved the learning quality. For example, research conducted by Handoyo and Asy'ari [4] proved that the utilization of the natural environment as a learning laboratory on science subject developed the elementary teacher training student's multi intelligence skills. Bahagia [2] also conducted research on improving learning outcomes through cooperative learning by using a jigsaw model with visual aids for students of grade V in elementary school. Moreover Nadlah's [9] study on the collaboration of real-life media and cork boards improved the learning outcomes of Spermatophyta subject.

In terms of process, there were a lot of researches performed either. For example, Haryono (1997) had developed a model of learning process characterized by the improvement of creative and critical thinking skills that significantly improve the ability of creative and critical thinking of elementary school students in Central Java. Haryono [5] also developed a science-based learning model of the scientific process to improve students' science skills encompassing the product, processes, and attitudes domain. Furthermore, Suseno (2011) developed the implementation of mathematics learning design that integrates vocational students' vocational skills development, Nugraha [11] developed online learning design based on the principles of e-pedagogy, Budiono et al. [3] developed the applied model of educational technology in the form of learning technology development team in schools, and Haryono [6] developed a model of quality assurance based on the learning applied of educational technology.

Based on theoretical and empirical studies above, this study intended to identify the school requirement on several educational technologist competencies and its level of requirement to push the improvement of the learning quality in schools. The competencies of educational technologists in this context are in the form of quality assurance, the development and management of learning infrastructure, the development of educational resources, and the implementation of the educational technologist as a functional career in schools.

II. METHOD

This study was conducted in Faculty of Educational Studies, State University of Surabaya, East Java, Indonesia. The samples were 321 people aged betwee 18 and 22 years (M = 20.46).

This study utilized two types of scale. First was Narcissistic Personality Inventory (NPI) which developed by Raskin and Hall in 1979 [15]. However, this study used the latest version of NPI, that was NPI-16 which adapted by Ames, et al. [1]. Second was Buss and Perry Aggression Questionnaire (BPAQ) which developed by Buss A.H. and Perry M. in 1992. The aspects were physical aggression, verbal aggression, anger, and hostility which related to Buss'

First, several competencies to support the learning quality assurance system in school are (1) analyzing the quality standard requirement, (2) developing the quality standard, (3)

book *"The Psychology of Aggression"* in 1961. Previous study found on BPAQ was proved that it was valid and reliable to measure aggression [8], then also in Argentina's version [16] and Turki's version [6].

Both scales were adapted in Indonesia version. Either NPI-16 (16 items, α = 0.91) or BPAQ (29 items, α = 0.88) were proved valid and reliable. Data analyzes used descriptive statistic for the first question and Pearson Correlation for the second question.

III. RESULTS AND DISCUSSION

The level of educational technologist competency requirement scale in schools is summarized in the following table.

TABLE I. SUMMARY OF EDUCATIONAL TECHNOLOGIST COMPETENCIES REQUIREMENT IN SCHOOLS

Aspects of competencies	Minimum scores	Maximum scores	Total scores	%
Learning quality assurance	8	32	26.84	83.88
The development and management of learning infrastructure	10	40	33.36	83.40
The development of school's educational resources	6	24	20.98	87.42
The implementation of educational technologist as a functional career on facilitating teacher	9	36	30.05	83.27
Total aspects	33	132	111.23	84.27

According to Table I, it can be obtained that the overall competencies of educational technology are required by schools. Empirically, schools need the support from professional staff to address the high quality educational services; because all of the school responsibilities need a professional handling, and it is not enough if only assigning the teachers to handle these responsibilities as an additional task. Moreover, the school responsibilities are divided into several tasks, i.e. (1) learning quality assurance, (2) developing and managing school infrastructure, (3) developing school educational resources, and (4) applying functional educational technologists to support the main tasks and functions of teachers. The research found that the percentage of the scores on the school requirement was very high on each task with mean score 84.27% (see table 1 above). The results of the study can be explained as follows. establishes the quality standard, (4) developing the system to achieve the quality standard, (5) developing the monitoring and evaluation instrument, (6) auditing the achievement of

quality standard, (7) reporting the result of the auditing process, (8) developing the follow-up programs. The results of this research relevant and confirm the previous research. For example, Haryono et al. (2016) found that most of the schools implement the quality assurance system, but empirically there is a lack of authentic document or archive as written evidence.

TABLE II.   THE COMPARISION OF THE EDUCATIONAL TECHNOLOGISTS COMPETENCIES REQUIREMENT AMONG JUNIOR HIGH SCHOOLS, SENIOR HIGH SCHOOLS, AND VOCATIONAL SCHOOLS IN CENTRAL JAVA

The aspects of competencies	Junior high school		Senior high school		Vocational school	
	Score	%	Score	%	Score	%
Learning quality assurance	26,08	81,50	27,40	85,63	27,05	84,53
The development and management of learning infrastructure	32,38	80,95	34,20	85,50	33,57	83,93
The development of school's educational resources	20,69	86,21	20,80	86,67	21,24	88,50
The implementation of educational technologist as a functional career in facilitating teacher	28,92	80,33	31,10	86,39	30,24	84,00
Total	108,08	84,27	113,50	85,98	112,10	84,92

This finding indicates that schools need the support from professional staff to ensure, develop and improve the quality assurance process appropriately. In other words, educational technologist as a professional staff have a task to analyze the quality standard requirement and then develop, implement, audit, report, and formulate the follow-up its programs. The process of learning quality assurance cannot be handled as an additional teacher's task and other school staff. But it should be conduct professionally and well organized, structured, and measurable.

Second, the basic competencies to develop and manage the school infrastructure i.e. (1) analyzing the needs of learning media, (2) analyzing the need of textbook, (3) analyzing the need of learning tools, laboratories, and material, (4) analyzing the need of the internet network, (5) managing the information and communication technology in school, (6) managing learning resources, and (7) developing and managing school website and information system. The research finds that the percentage of the scores on the school requirement of the staff who competence to handle the school infrastructure development and management are very high on each task with mean score reach 83,40%.

This result strengthens Budiyono's, et al. (2015) study in which concludes that the implementation of educational technology development teams in schools has several tasks in developing school's website and managing school's ICT system. The development and improvement of school quality need a support from the educational technologist who have highly qualified competencies to analyze, design, develop,

Fourth, the basic competencies to facilitate teacher's main task and function are (1) conducting need assessment to develop educational technology's model to support the curriculum implementation, (2) conducting need assessment to develop learning media to support the curriculum

on the school requirement of the staff whose competences are to support and facilitate the teacher and

produce, and managing school learning system. So it is can be concluded that basic tasks and responsibilities to develop and manage school's learning infrastructure is inappropriate if only imposing it as an additional task to the teachers.

Third, the basic competencies to develop and improve the school's educational resources encompassing several tasks, i.e. (1) conducting need assessment for teacher and staff training programs, (2) designing and developing teacher and staff training programs, and (3) organizing and managing teacher and staff training programs. The research finds that the percentage of the scores on the school requirement of the staff who competence to handle the school educational resources development and management are very high on each task with mean score reach 87,42%. This finding confirms that the school needs a support from the educational technologist who have a highly competent to analyze, design, develop, managing, and evaluating teacher and staff training programs to improve their personal and teamwork capacities.

This finding confirms the conclusion of the previous research by Budiyono et al. [3] who said that educational technologist team in school have a great contribution to facilitate the human resources development programs through teacher and staff training programs. With the presence of educational technologists several improvement programs for the teacher and staff had been designed and developed more systematically and well implemented and evaluated. Moreover, these tasks are no longer as an additional task for the teacher and staff as before.

implementation, (3) designing and developing educational technology's model in school, (4) facilitating teacher on designing and developing teaching materials, learning media, and e-learning, (5) evaluating the learning materials and media feasibility. The research finds that the percentage of the scores

school staff on doing their tasks and duty are very high on each task with mean score reach 83,27%.

This finding confirms that school need a support from educational technologist who are competent to support and facilitate teacher and school's staff for learning and professional purposes. Actually, teachers really need partners in designing, developing and producing media and teaching materials for the learning purposes. In addition, teachers also need partners to produce innovative works for their professional achievement. Moreover, school management also needs accurate information from the educational technologist to make an appropriate decision related to the supply and managing the certain educational technology product. In this point the assessment and research activities on the feasibility of a certain educational technology product is important, as well as evaluating its implementation. Therefore, the presence of educational technologists in schools is the solution in optimizing the partnership of teachers with other school's staff.

Fifth, among the four other areas of educational technology competencies above, the competencies in developing and improving the educational resources (teachers and school staff) capacity gain a highest score (87.42%). This finding shows that the development and improvement of the teacher and school's staff capacity are important to be handled by a professional staff in school. So far, the development programs to increase the teachers and school staff are less well handled. For example, the training on career development program for teacher and school's staff is without afore thought, more personal, and is handled by one teacher or school's staff as an additional task. The presence of educational technologists in schools is expected to handle the problems of the teacher and staff competencies and career development program systematically, well programmed and structured.

Moreover, related to the level of education, table 2 describes the educational Technologists Competencies Requirement in Schools.

According to table 2, it can be concluded that all of the schools of all educational levels in this research need a support and facility from educational technologist who have a high competency to facilitate and improve the learning process, teacher and school staff competencies and career, and develop and manage school's educational resources. Among the three levels of education it seems that senior high school shows the highest scores of requirement, while junior high school has the lowest requirement score. It can be explained that as the development of science and technology especially in the field of information and communication technology (ICT), high school teachers feel need more support partners to improve their self-capacity and learning performance. They are aware that they need to collaborate with other school's staff in order to develop several innovations in teaching and learning process.

It seems that most of the schools aware about the need for other resources with certain competencies to achieve the excellent school services, and not enough if only depend on

the old way, i.e. give the teacher and school's staff several additional tasks. The implementation of the process of learning quality assurance, the development and management of learning infrastructure, especially school's information systems, the development of school educational resources, is not enough as an additional task for the teacher and school's staff. However, it does not mean that junior high school and vocational school teachers do not have awareness, they just maybe not as strong as high school teachers

IV. CONCLUSION

The findings of this study can be summarized as follows. *First*, most of the school in this research required educational technology competencies to enhance and improve the learning quality assurance in schools, the development and management of school learning infrastructure, educational resources, and the implementation of educational technology as a functional career in school on facilitating and improving teacher performance. *Second*, the educational technology competencies to develop and manage the human resources development in school become the most school requirements. *Third*, senior high school has a higher requirement score comparing to junior and vocational school. It means most of the teacher and school's staff needs a support, facilitation and partners to improve their performance.

Based on the discussion above it is well recommended to hire an educational technologist as school's staff in the form educational technology developer as a functional career in school. For this purpose, we should make a clear and comprehensive description about the main task of educational technologist as a school's staff. The field of educational technology on quality assurance of learning, developing and managing school learning infrastructure, developing school educational resources, and the implementation of educational technology as a functional career on facilitating teacher performance are the source of educational technology competencies that can be implemented in schools.

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