Factors affecting Competence of Information Technology Vocational High School Teacher

Hamonangan Tambunan
Medan Estate University, North Sumatera-Indonesia

ABSTRACT

The purpose of this study is to obtain information concerning with factor that affected Teachers’ information technology competency of vocational high school. Research was conducted in Medan by using a survey method involved 245 teachers of 12 state vocational middle schools as respondents who were selected by proportionate random sampling. This research was found teachers’ information technology competency can be improved by enhancing teachers’ interpersonal communication, the use of information technology equipment, teachers’ perception of information technology and teachers’ self improvement.

Keywords: Information technology competence of teachers

INTRODUCTION

Many attempts were made to get the offender learning optimal learning results, but still can not meet expectations. On the basis of the necessary information about the factors associated with learning problems, especially the use of computers for learning. In this regard the skills and knowledge in information technology is a very important requirement for teachers.

The linkage between technology, dissemination of information in the development of human resources, and individual readiness for work, can start from home (Chin & Horton, 1994). This has an impact on the level of professional educators (teachers) and learning responsibilities as planners. Teachers as agents of change among learners and technology, plays an important role in the learning process. Teachers are required to follow the development of technology to improve its information technology competencies to ensure its position as a leader in the use of learning technology.

The new technology promises a rich educational experience and provide significant gains in learning when using technology. Learning by using traditional methods and internet together is better than learning to use the internet or just a traditional lecture course (Dede, 1997; Goldberg, 2005). Achievement of students with learning using the internet in a laboratory, higher than students who are taught using a traditional classroom approach (Day & Raven, 1998). Learning is more fun, more motivated, and students' understanding of concepts better during the learning with computer-based learning (Ganguli, 1992). In learning chemistry through a computer simulation the students get better scores than students who learned with the traditional lecture method and the method of repeated learning (Jackman & Moellenberg, 1998).

Thus a good learning outcomes, can be generated by using the right technology in learning, and teachers must be competent in the field of information technology in order to utilize information technology in learning. Thomas (1993) stated that there needs to be a standard for (1) The use of computer-based technology to access information to increase personal productivity professional teachers, and (2) use of computers and related technology to facilitate the role of teachers and students who appeared in the learning activities. In connection with this research needs to include pedagogy teachers the right knowledge and experience with computer education, including the use of computer and technology related to learning, assessment and professional productivity (NCATE, 2000).

Teachers are needed now is a teacher who understands the use of information technology . Understanding of technology is a new basic skills (Nagourney, 1989 ). And understanding of the use of information technology can be studied alone . Pomeory (1990 ) found that half of the vocational teachers ( the sample ) has never been a student in the computer field. As many as 62 % are self-study, and 71 % stated that computer skills possessed was studied after began working as a teacher . It gives
the sense that it turns on the use of knowledge and skills can be learned on their own computers in order to be competent. The importance of these competencies that teachers can incorporate the five key learning conditions, namely (1) the real-world context for learning, (2) relationships with outside experts, (3) visualization and analysis tools, (4) guidance (scaffolds) for problem solving, and (5) opportunities for feedback, reflection, and revision (McCombs, 2005: 1). Thus information technology has become an integral part of learning as a result of global change (NCATE, 2005: 1).

Information technology is a hardware and software used to implement the use of the training/practice, tutorials, simulations/games, word processing, coloring/drawing, music composition, spreadsheet/graphics/statistics, electronic bulletin boards, electronic encyclopedias, automatic card catalog, student information, packet communications, electronic mail, conference groups and budget inquiry. Adult learning theory of information technology competence, because the necessary aspects of computer learning self-directed (self-direction), intrinsic motivation, problem-solving task, and the value of approaching learning activities (Heerman, 1986: 117-124). Practice combines competence in knowledge system software with specialized skills is essential in order to prepare the implementation of learning (Zemke, 1984: 45). By combining this competence, teachers will facilitate the process of learning materials and information to implement learning by using technology. For this Burke (2005: 2) states, teachers are required to not only know how to use the technology but also have to know when and why to use it.

Important single factor in determining the success of technology in the classroom is the teacher to understand and be able to use a computer. The technology is said to be successful if the technology can be used in accordance with the utilization goals. Information technology competence of teachers is the ability to use information technology in play (using) on-line and library research, manipulating and analyzing data, writing the text and hypertext, planning charts and create multimedia products, and is a standard unit of computer technology in the use of technology in the classroom. These standards are grouped into four general domains, namely: (1) the operation of the basic technology, (2) the use of a personal and professional technology, (3) social issues, ethics and humanity, and (4) the use of technology in learning. Each domain can be described in specific skills, competencies are sequenced from simple to complex so that comprehension skills can be cumulative (New Century College, 2005: 1; Teacher Technology Competency Committee, 2005: 3).

Information technology in teaching allows the expansion of the power of perception, comprehension, analysis, thought, concentration and articulation through a series of activities. There are several factors that play a role in influencing information technology competencies. Evanciew (1999) stated that competency can be established through effective communication and continuous learning efforts that are part of self-improvement. And Sa’ari (2005) states that the same perception of teachers also influence teachers’ information technology competencies. Based on the positive perceptions of teachers, formed an effort to learn the elements of self-improvement. The relationship between these factors can be described as Figure 1.

![Figure 1. Factors Relation](image)

IC = Interpersonal Communication
UIT = Use of Information Technology
TP = Teacher Perception
SI = Self-Improvement
ITC = Information Technology Competence
METHODOLOGY

To obtain the data, the survey was conducted using questionnaires to uncover teachers' interpersonal communication with a reliability coefficient = 0.9167, Questionnaires use of information technology devices with a reliability coefficient = 0.9176, questionnaire on teachers' perceptions of information technology with the reliability coefficient = 0.9354, and questionnaire self-improvement of teachers with a reliability coefficient = 0.9381. Data information technology competence of teachers obtained through information technology competency assessment form teacher with inter-rater reliability coefficient = 0.7309. Sample size of this study as much as 245 people were taken randomly with proportionate random sampling technique of the total population 686 people. Data were analyzed using SPSS and Lisrel.

RESULTS

The data obtained were depicted in the form of mean, median, mode, and the categories are based on the comparison criteria that an ideal score of each variable. Teacher interpersonal communication variable data average = 41.52, Median = 41, and mode = 41. On the average, the teacher interpersonal communication in the category less. Variable data using information technology devices average = 41.69, Median = 42, and mode = 40. On the average, the use of information technology tools in the category less. Variable data about the teacher's perception of information technology with average = 134.15, Median = 134, and mode = 132. On the average teacher's perception of information technology at the high category. Data variables of self-improvement of teachers with average = 77.49, Median = 77, and mode = 49. On the average teacher interpersonal communication in the category pretty. Data variables of teacher competence in the field of information technology with average = 67.11, Median = 67, and mode = 66. On the average teacher competence in the field of information technology in the category pretty.

Test conducted on requirements analysis, found that the condition of normality, homogeneity and linearity are met so that transactions are carried out further tests. Test results of a simple model of causality correlation between variables shown in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>IC</th>
<th>UIT</th>
<th>TP</th>
<th>SI</th>
<th>ITC</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UIT</td>
<td>0.30*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP</td>
<td>0.24*</td>
<td>0.30*</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SI</td>
<td>0.53*</td>
<td>0.32*</td>
<td>0.33*</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ITC</td>
<td>0.43*</td>
<td>0.50*</td>
<td>0.49</td>
<td>0.45*</td>
<td>1</td>
</tr>
</tbody>
</table>

(* = Sig. 0.05)

Model test results show the model is fit to the data so that it can be used generalize information technology competence of teachers.

<table>
<thead>
<tr>
<th>Goodness of Fit (GOF)</th>
<th>Estimate</th>
<th>Model Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square (df = 1)</td>
<td>31.13</td>
<td>Fit</td>
</tr>
<tr>
<td>Nilai P</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>Root Mean Square Error of Aproximation (RMSEA)</td>
<td>0.353</td>
<td></td>
</tr>
</tbody>
</table>

Path coefficients between variables were obtained, showing all path coefficients are significant, which means no need for modification. Based on this, it can be mentioned the pattern of causal relationships between variables is the same as the proposed model. The results show that the model line has been built to meet the testing standards stated as a good model. Appropriate means of information technology in improving the competence of vocational high school teachers in the field, based on the
variables teacher interpersonal communication, the use of information technology tools, teachers' perceptions of information technology, and self-improvement of teachers as shown in Figure 2.

![Figure 2. Path Diagram](image)

| IC   | = Interpersonal Communication |
| UIT  | = Use of Information Technology |
| TP   | = Teacher Perception |
| SI   | = Self-Improvement |
| ITC  | = Information Technology Competence |

In Figure 2 it appears that for a significance level $\alpha = 0.05$, statistically, (1) teacher interpersonal communication affects teachers' perceptions about information technology directly, (2) the use of information technology devices directly influence teachers' perceptions of information technology, (3) interpersonal communication affect teacher self-improvement of teachers directly, (4) the use of information technology tools affect self-improvement of teachers directly, (5) teachers' perceptions about self-improvement information technology affect teachers directly, (6) interpersonal communication competence of teachers affect teachers' information technology directly, (7) the use of information technology affecting teachers' competence in the field of information technology directly, (8) self improvement information technology competence of teachers affect teachers directly. Based on the findings of this study concluded that the model established relationship variables can be used to generalize the level of competence of teachers of information technology.

DISCUSSION

Information technology competence of teachers is a factor that needs to be improved greatly. Teachers who are competent in the field of information technology is needed to help students find information, process information and present information related to the needs of the students during the learning process, which makes it will be the students' future life provision.

The findings of this study indicate that teacher interpersonal communication, the use of information technology tools, teachers' perceptions of information technology, and self-improvement of teachers themselves are the factors that determine the competence of teachers of information technology. Where the self-improvement of teachers is also influenced by the interpersonal communication of teachers, teachers' perceptions about the use of information technology and information technology. Similarly, that the teacher's perception of information technology is influenced by interpersonal communication teacher and use of information technology devices. This is consistent with the findings of research conducted by Sangra & Gonzales (2010) on the role of information and communication technologies in improving the learning and teaching process.

Thus to improve the competence of teachers of information technology can be reached by increasing the frequency of teacher interpersonal communication with friends colleagues teachers, students and...
even the public to get the latest information regarding the usefulness of information technology in the field of learning. Based on the information obtained, the teacher can learn through their own initiative or through discussion with people who are better informed on such information.

The effort also will be able to increase the knowledge and skills of teachers, meaning a self-improvement of teachers. With the self-improvement of teachers in the field of information technology competence of teachers will be competent in the use of information technology in learning. That this situation can occur wisely education managers working with institutions engaged in the field of information technology. Such collaboration can be realized by conducting seminars, workshops. Through this kind of communication will be established between the parties involved in the activity, as well as to obtain the latest information.

Teacher's perception of information technology is an important factor in improving information technology competence of teachers. From the findings of this study it appears that these factors influence positively and significantly to information technology competence of teachers. This is consistent with research findings Gosper et.al, (2010) about teaching and learning and web-based lecture technologies. So in order for teacher competence in the field of information technology can increase the teacher needs to realize and accept the importance of the benefits of information technology in learning. With the awareness of the importance of the teacher, would be compelled to be able to understand the use of information technology. This is an ongoing process of self-improvement of teachers. Self-improvement of teachers resulted in an increase of information technology competence of teachers.

Way that can be taken for teacher raises awareness of the importance of the benefits of information technology in learning, can be reached by involving teachers in activities that use information technology tools in learning. For example, in implementing learning activities, teachers need to be prosecuted using the resources supporting learning than textbooks. Similarly, the administration of learning need to use the equipment. This will make teachers more aware, and feel the benefits of the information technology in the task. Through these activities, the teacher will certainly keep abreast of developments in the field of software (software) that can assist teachers in learning. Under this makes the teacher will have a positive perception of the benefits of information technology.

Another factor related to the competence of teachers of information technology is the use of information technology tools. Thus information technology competence of teachers can be improved with practice teachers use information technology devices. Practicing teachers develop the knowledge and skills possessed in the field of information technology use in learning. The use of this device as often as possible, will provide wider opportunities for teachers to use, both for practice and personal tasks and professions. Similarly, by developing their own knowledge through exercises, discussions with his teacher, and even share their knowledge with other teachers, both within and outside the country through a network of service facilities are available.

This situation allows the teacher to improve its information technology competencies. Self-improvement of teachers is continuously ensure teachers are competent in the field of information technology. These efforts can not be separated from the budget, to ensure proper use of information technology devices intended, the manager of education need to increase budget allocations to hold the device. Similarly, the schools are expected to keep good relations with other institutions that are competent in the field of information technology in order to obtain the latest information.

SUGGESTIONS
Have suggested that the findings related to this study, namely: First, the institution and the teacher would give attention to information technology competence of graduates. This is in accordance with the demands of today's technological advances learning. You should pour utilization of information technology in the curriculum for student teachers for all subjects;

Second, the managers of both private and public education, it's time to clean themselves. Education managers should allocate sufficient funds for the development of learning technologies. Utilization of this technology will be effective if the executor has the competence to learning it. Therefore it is the teachers who will need to be increased competence, through training in schools and provide short
courses to the implementation of learning. In this way is expected to improve the competence of teachers. Thus teachers should help students to more easily obtain the required information related to the areas being studied. Similarly, through the executive competence of learning to enrich their knowledge and skills through the ease of getting information to the information technology facility. Third, the study participants, expected to increase competence, whether it is through self-study or training depending on the situation permits, the managers of learning for competence in this field; Fourth, the network providers would be able to provide fee waivers for schools that require service network, so that efforts to improve the quality of education nationwide to provide maximum results; And fifth, next to the investigators are expected to examine other factors related to information technology competence of teachers, in order to obtain more information, so in an effort to improve the competence information technology teachers, can be more effective.

LITERATURE
Chin S. & Horton J.A. Teachers’ Perceptions Of Instructional Technology And Staff Development (Journal of Educational Technology Systems, 1994)
Day T., Raven M., & Newman M., The Effects Of World Wide Web Instruction And Traditional Instruction And Learnig Styles On Achievement And Changes In Student Attitudes In A Technical Writing In Agricommunication Course (Journal of Agricultural Education, 1998)
Ganguli A.B. The Effect On Students’ Attitudes Of The Computer As A Teaching Aid (Educational Studies in Mathematics, 1992)
Gay Susan M. Teaching With Technology: A case Study Of Teacher’s Perceptions of Implementing Computers Into the Classroom. 2005 (http://www.cci.unl.edu/default.html)
Heerman B. Personal Computers And Adult Learner (San Francisco: Jossey-Bass, 1986)
Jackman L.E., Moellenberg W.P & Brapson G.D. Evaluation Of Three Instructional Methods For Teaching General Chemistry (Journal of Chemical Education, 1987)
New Century College, Information Technology Competency. 2005
Pomeory J.L. Determining The Computer Literacy Levels Of Vocational Teachers In Southern Nevada And Developing A Computer In-service Program For Vocational Teachers (ERIC Document Reproduction Service No. ED 32445, 1990)
Sa’ari Juanna Risah, Luan Wong Su & Roslan Samsilah. Attitude and Perceived Information Technology Competency among Teachers (Online: Malaysian online journal of instructional technology, 2005)

