THE DEVELOPMENT OF INNOVATIVE-*DICK-CAREY* TRAINING MODEL TO IMPROVE BIOLOGY TEACHER PERFORMANCE IN APPLYING ICT AT THE STATE SENIOR HIGH SCHOOLS IN SEMARANG CITY

Kustiono[1]✉ Rasdi Ekosiswoyo[2], Willem Mantja[3], Soesanto[4]

[1]a Candiddate of Doctoral Degree at Semarang State University, Central Java, Indonesia
[2]a professor from Semarang State University, Central Java, Indonesia
[3]a professor from Malang State University, East Java, Indonesia
[4]a professor from Semarang State University, Central Java, Indonesia

Abstract

Learning condition and situation at schools now need severe teachers performance so that they are not out of date in applying ICT for the sake of education. The application of ICT in education will only be slogan and rhetoric if there are no any serious actions. One of them is the teacher should be a front guard/starter at school. The research problems: (1) how is the grand design of the developed ICT training? (2) how is the effectiveness of the development result-model?. The research findings: (1) the developed ICT training model design is the Innovative Dick-Carey (IDC) model which is developed by combining Dick-Carey, BPTKIP, and LPMP models, (2) as the final model result, through the t-test, the IDC training model is very effective to improve teachers performance in learning process. It is suggested that every school should provide educational infrastructures which can give more chances to ICT to be implemented in learning process.

© 2013 Universitas Negeri Semarang

✉ Alamat korespondensi:
Kampus Unnes Bendan Ngisor, Semarang, 50233
E-mail: kustiono2013fip@gmail.com

INTRODUCTION

It is a dilemma, that at first, a side of education process at a certain education unit is expected to be interactive, inspire, fun, challenging, well-motivated to the students to actively participate and share opinion, creativity, and built the independence learning based on their talent, interest, physical and psychological development. However, on the other side, the learning process conducted by teachers nowadays is still exterminating the students' potencies. The learning process are going monotonously and boring instead of going as the initial expectation. Secondly, our education system is still far away from the touch of information and communication technology. There are lots of schools which have become the user of ICT, but the question is whether they have applied it optomally or not. A common *syndrome* in our education system is "Smart enough to provide the equipment, but stutter in taking care and using it". Third, the paradigm of our education has not changed yet. Even though the education system has changed, from centralization to decentralization, but the management system is still same as the previous one. School leadership is like feudalist as a little affluent. The education operators, who serve, are now asking to be served. The education execution is still waiting for the orders from the leader, without any creativity or innovation. Schools get lots of equipment and facilities from the government, but they never want to study how to use those things. Therefore, many televisions subsided program that aim to access the TV-education are still set on their places, even packed. Fourth, teacher empowering program does not work well. Digital era has come into all life aspects in this country. Virtual world can provide an up-date, exciting, and actual information. However, how many teachers have tried to access them to the sake of education?. From this point, in this modern era, it is a big mistake if a teacher thinks that he is the only source of information.

In the writer's opinion, ICT can be optimized if the teachers as the front guard of our education system are literate of modern technology. The teachers are at least expected to be able to operate the ICT so that the students can enjoy the teaching media with full of emotion and outlook.

In line with ICT development, our government through the National Education Ministry insists on including ICT materials to the curriculum KTSP 2006 for all school levels, where the computer as a ICT major component, has a very urgent role and position in the school education system as a one of integrated learning media.

Based on the above description, the high inspiration of society and government spirit to increase the education quality in every school, level, major department, as written in vision, mission, and ICT purposes integrated in the education process. However, is that goal has been complemented by the schools and teachers readiness to implement ICT in their class activities?. Besides, is there any qualified training and models to reach that goal?

From the problem background above, we can identify the research problem is how the developed training model is and its effectiveness. Specifically, this research is aim to describe the training model which will be developed and its effectiveness in improving the teachers performance in applying ICT.

Theoritically, this research can obtain the detail information about the developed training model and its effectiveness in improving teachers performance in applying ICT. Practically, (1) this research result will be a recommendation for General Directory of Educational Human Resource and Education Quality Development (PMPTK) and General Directory of Primary and Secondary Education Management (MPDM) to improve the training model in order to increase the teachers competence, (2) it will be also a reference for Semarang Education Service in sub-district or city to apply ICT at Senior High Schools, (3) for the schools, it will be a positive spirit to apply ICT in the learning process and other educational creativity such as school website and blog to accommodate inspiration and

expression of the school members, (4) for the principal and supervisor, it will be a reference to train teachers to apply ICT, and (5) for students, it will add their knowledge by accessing the online sources of study, so that they will find the broader and easier materials.

Education and Training which are shortened as "Diklat" morphologically derived from the word "Education" and "Training". Gomes (1997) in Rusman (2006) stated that training is an effort to reform a certain job achievement which becomes his responsibility, which must be planned in a certain way in order to gain organization purposes generally and the participants individually.

The success of educational institution in conducting a training depends on its management system including planning, executing, supervising, and evaluating. According to Handoko (1999) in Wahira (2012:42), education management is a continuous process which is done by educational institution by conducting its functional management, which has influential effort and supervising, so that all educational organization performance can achieved its goals. Mantja (2008) asserted that education management is a organizational management whose purpose to support the subject learning process and institutional. Education management laid down several management functions whose purposes to effect and define the education purposes.

Information and Communication Technology (ICT), based on Indonesian Wikipedia, Free Encyclopedia in *http://id.wikipedia.org/wiki/Teknologi _Informasi_Komunikasi* called as a big umbrella of terminology which includes all technical stuffs to process and convey information. ICT covers two aspects; information technology and communication technology.

Information technology includes all aspects related to process, the application of supporting tools, manipulation, and information processing. Whereas communication technology means all things related to all supporting tools to process and transfer the data from one hard ware to another one. From that reason, information technology and communication technology are two aspects that can not be separated.

As a learning medium, ICT, in any case, can give additional value for the achievement of behavior change of the students as competed as the followings: (1) there is a direct interaction between the user and individual study material, (2) it can improve the students interest, (3) it can drive the students to have an independent and continuous study, (4) there is a feedback to the students responses, (5) it can deal with the limit of class condition, room, time, and students senses, and (6) it can avoid verbalism (Sheel & Richey, 1994).

Simply, these are the benefits of ICT utilization towards the development of teachers performance in learning process: (1) for presenting and demonstrating an audio record or video of activities, (2) for virtual experiment activity, (3) for virtual classes where the students are driven to study independently based on web, where the students will get *online* materials, task, and test.

RESEARCH METHOD

The research used Research and Development (R&D) method. In R&D, the researcher examines the object to get new product and then examines the effectiveness of that new product (Sugiyono, 2009:427). It used descriptive qualitative research because the research will describe objectively the facts in the implementation of ICT during the learning process in Semarang city.

The research was conducted at SMA in Semarang city. The subjects of the research are 16 Biology teachers of Public SMA in Semarang city.

The data gathering technique used observation method and questionnaire (primary method) and documentation study as well as interview (supplementary method). The data analysis technique used presentage description and descriptive qualitative technique. The effectiveness test of developed model draft used single one shot case study experiment design (Sugiyono, 2009) and completed with t-test.

According to Ali (1992) in Sugiyono (2009), he explained that quasi-experiment research is almost like true-experiment one. The difference is in the use of subjects. In quasi-experiment, it does not use random technique, but use intact group. In this research, the quasi-experiment used single one shot case study with the formula as below:

$$\boxed{\text{O} \quad \text{X} \quad \text{O}}$$

X : treatment (implementation of ICT training model)

O : observation of the result at the beginning and the end

Chart 1. Experimental method using single one shot case study design
Source: Sugiyono (2009)

The researcher used experimental method using single one shot case study design to test the effectiveness without using control group. The use of t-test to measure the effectiveness because the data are gained from the same group at the beginning and the end of research (pretest and posttest).

Through the non-independent t-test, it will be known the influence of ICT training towards teachers skill of Senior High School (SMA) in applying ICT. If the co-efficient of t_{test} is bigger that t_{table} , it can be concluded that the DCI training model design as the ICT training model to improve the teachers performance in applying ICT can improve the teachers competence in developing learning quality significantly.

In addition, the instrument of gathering data can be validated soon through predictive validation and content validity. The predictive validity is to consult the model, training program, guidebook for instructor, guidebook for participant, training materials, training media to the experts and teachers. The content validity is to consult the research instruments to the experts basen on their specialty such as the expert of training management, the expert of training materials and computer/inthernet software, and the expert of media (Sugiyono, 2009).

RESULTS AND DISCUSSION

Based on the data gained through questionnaires, observation and interviews with some competent parties such as principals, teachers, and laboratory assisstants in some Senior High Schools in Semarang city, the results can be described as follows:

1) There are two models of factual coaching on SMA teacher performance in the filed. They are the model from BPTIKP Central Java Province and from LPMP Central Java Province. The Training Model of BPTIKP Central Java Province still has a lot of weaknesses. They are (1) the planning is on limited aspect, (2) the competency does not meet the needs of teachers, (3) the implementation is not effective, (4) the materials is not appropriate with the needs, (5) the lack of practice media, (6) There are no textbooks, (7) there are no handbooks for tutors and participants, (8) the evaluation is limited on the products, (9) the management is not well-regulated. The training model of LPMP Central Java province still has a lot of weaknesses too. They are the management is not well-regulated, the planning is on limited aspect, the competency does not meet the needs of teachers, the materials is not appropriate with the needs, and so on. Besides those two training model, there is the theoretical model of Dick – Carey. It has quite a lot of advantages. One of them is the use of a system approach so that the process occurs in synergistic, systematic and systemic way. In developing this draft of ICT IDC model, the researcher adopted it for the planning steps. Hopefully, with these 9 internal steps and 1 external step, the planning process can be implemented more focused, goal orientated, and all the components work in synergistic way. Whereas, the integration of the two empirical models (from BPTIKP and LPMP Central Java province) appears in the implementation and evaluation stage.

2) Through the standard of developmental research mechanism, it has successfully developed a draft of ICT training model called Innovative *Dick-Carey* (IDC). IDC is an integration of empirical models of BPTIKP and LPMP Central Java Province and also theoretical models of *Dick - Carey*, as shown in chart 2 below.
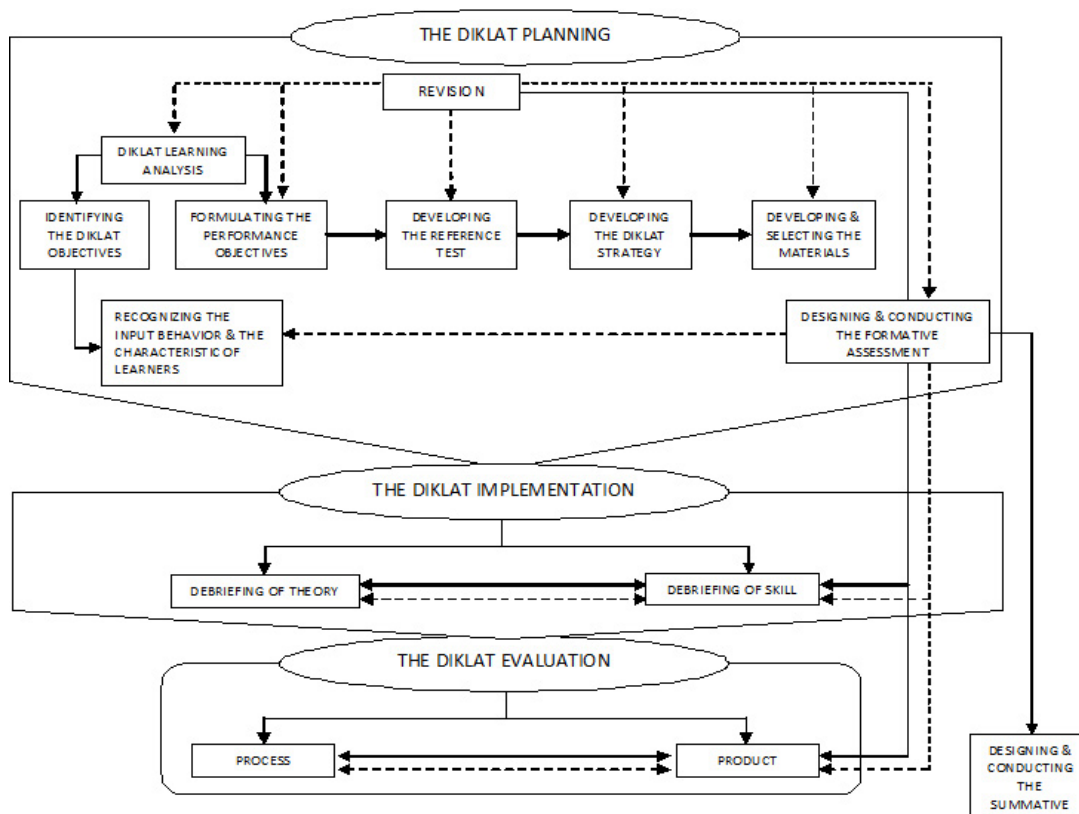

Chart 2. The Draft of ICT Training Model integrated with Innovative *Dick-Carey* (IDC)
Source: Adapted from the design model of Kustiono (2012)

With the operational steps:

a. The planning stage, including internal steps: (1) identifying the purpose of learning, (2) conducting the learning analysis based on the objevtives, (3) recognizing the input behavior and the characteristics of learners, (4) formulating the performance objectives, (5) developing the reference benchmark test items, (6) strategy development, (7) developing and selecting the instructional materials, (8) designing and assessing with formative assessment, and (9) revising the development process.

b. The implementation stage, including the following steps: (1) debriefing the theoretical materials of Training, and (2) debriefing the standard skills of Diklat.

c. The evaluation stage, including the following steps: (1) conducting a formative evaluation on the Training implementation process, (2) conducting a formative evaluation on the products created in the internal processes of Diklat, (3) following up to the outcomes of Diklat, and (4) conducting the summative evaluation on the products externally.

3) The effectiveness of the draft of ICT IDC training model can be described through the results of a limited test in order, including the test results of individual, small group, medium group, and broader group. In the stage of individual test towards the implementation of IDC ICT training model, the score is 21.66 (88%) with the "very effective/very satisfying"

qualification. The average score of the small group test stage is 22.9 (86%) with the "very effective/very satisfying" qualification. The average score of the medium group test stage is 23.3 (87%) with the "very effective/very satisfying" qualification. The average score of the broader group test stage is 23.12 (87.5%) with the "very effective/very satisfying" qualification. As the result, it can be concluded that the total mean score of all assessment aspects and the four stages of test on ICT IDC training model are in "very effective/very satisfying" qualification. Therefore, these aspects did not necessary any improvement. However, the training aspects related to teaching materials, training textbooks, training Guidebook, training models, training evaluation and targets, training procedures and implementation still need improvement because the results obtained were not maximum yet.

4) The effectiveness seen from the pretest and posttest through the four stages and t-test can be described in the table 1 below.

Table 1. The results of pretest, posttest and the t-test of ICT IDC Training Model on the test of individual, small group, medium group, and broader group

Testing Stages	$\sum N$	Pretest Mean Score (X_1)	SD Sampel (s_1)	Posttest Mean Score (X_2)	SD Sampel (s_2)	$T_{account}$ Score	Df	T_{tabel}
The test of individual	3	66,7	42,35	84	28	-3,765	4	2.776
The test of small group	5	64,4	8,3	84,6	19,8	-8,52	8	2,306
The test of medium group	10	67	13,1	88,1	25,56	10,72	18	2,101
The test of broader group	14	68,43	15,96	89,29	28,374	11,717	26	2,056

Based on the pretest, the posttest and t-test results of the four test stages on the IDC model showed that: (1) the mean score of the posttest results is higher than the mean score of the pretest. On the other hand, it is 100% above Minimal Completeness Criteria (KKM). It means that that the training IDC model is able to influence positively on behavior change of the participants, (2) the mean score between pretest and posttest through the four stages is significant. It means that the implementation of ICT IDC training model is an effective way. It can be seen from the score of t-test is higher than t-table in the confidence and Df level.
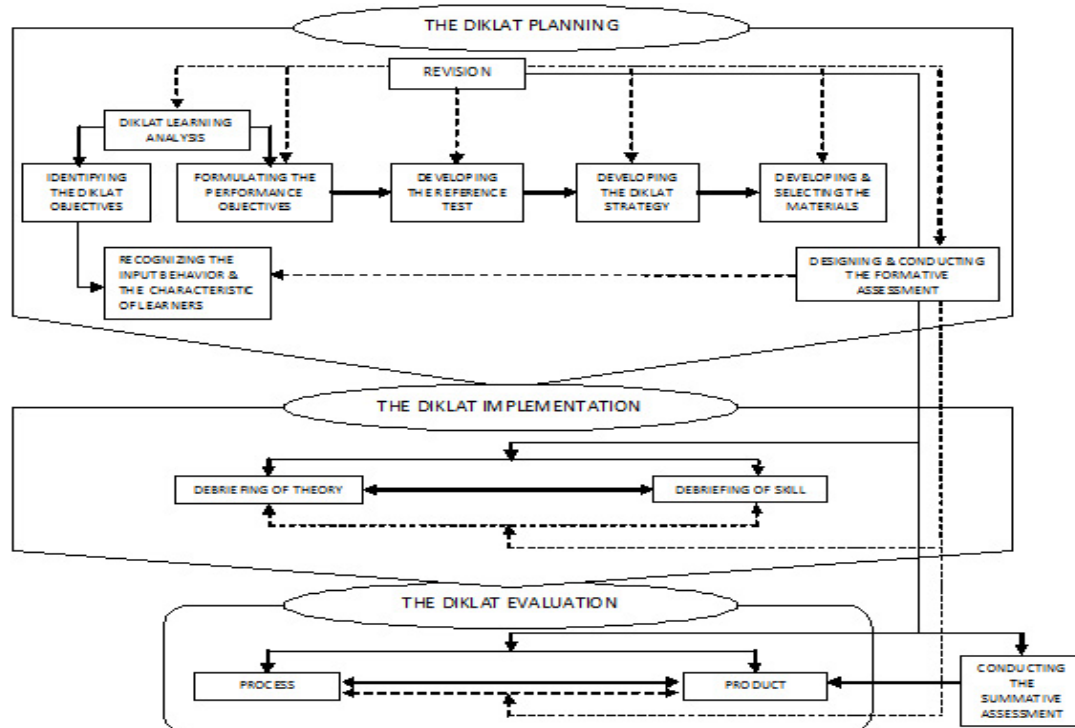
Chart 3. The Final Model of ICT Training Integrated with IDC
Source: Adapted from the *Dick - Carey* model and FGD Expert Team (2012)

5) The Test Result by the Expert Team. The team consists of management expert, ICT expert and media expert on various aspects of IDC training model in line with their skills. With some highly contributive recommendations to the development of the final IDC model, it can be stated that: (a) the quality of training management has reached the qualifcation of "effective" to "very effective", (b) the quality of the program and training schedule has reached the qualifcation of "effective", (c) the sufficiency of application software and the quality of training materials, textbooks and guidebooks (for instructors/ participants) has reached the average of qualifcation until "very sufficient" level. The final model of IDC is an updating of the model draft which can be described in the following chart 3.

Definitely, the steps are more applicable and systematic. They are:

1. The planning stage, including internal steps: (1) identifying the purpose of learning, (2) conducting the learning analysis based on the objevtives, (3) recognizing the input behavior and the characteristics of learners, (4) formulating the performance objectives, (5) developing the reference benchmark test items, (6) strategy development, (7) developing and selecting the instructional materials, (8) designing and assessing with formative assessment, and (9) revising the development process.
2. The implementation stage, including the following steps: (1) conducting pretest and beginning the training activity, (2) debriefing the theoretical materials of Diklat, and (3) debriefing the standard skills of training and synchronizing to the theories, (4) conducting posttest as a formative evaluation in achieving the competencies at the end of training.
3. The evaluation stage, including the following steps: (1) conducting a formative

evaluation on the training implementation process, (2) conducting a formative evaluation on the products created in the internal process of training, (3) following up the out comes by doing some revisions on the failure of activity process in each stage and improving the product quality at the end of training, and (4) conducting the summative evaluation on the products externally.

CONCLUSIONS

With the development of mechanisms and standard testing process, the draft of ICT IDC training model has been developed by combining the empirical models of BPTIKP and LPMP Central Java province and the theoretical model of Dick - Carey which meet to the needs and based on the principles of effective management.

Through the limited testing, the broader testing, the test of expert and pretest- posttest, it showed that: (a) the final model of ICT IDC training is able to influence positively on behavior changes of the participants, (b) There was a significant difference in the mean score of pretest and posttest. It means that the implementation of final model of ICT IDC training is very effective.

REFERENCES

Dick, W.; Carey, L. 1978. *The Systematic Design of Instruction*. First Edition. USA, Florida: Scot, Foresman Co.

Haryanto, Edy. 2008. *Teknologi Informasi dan Komunikasi: Konsep dan Perkembangannya. Pemanfaatan Teknologi Informasi dan Komunikasi sebagai Media Pembelajaran.* Wikipedia Bahasa Indonesia, Ensiklopedia Bebas. http://id.wikipedia.org/wiki/Teknologi_Informasi_Komunikasi (diunduh 17-4-'11.

Mantja, W. 2008. *Profesionalisme Tenaga Kependidikan Manajemen Pendidikan dan Survise Pengajaran*. Malang: Elang Mas.

Rusman. 2006. *Pendekatan dan Model Pembelajaran*. Bandung: UPI

Seels, Barbara B.; Richey, Rita C. 1994. *Instructional Technology: The Definition and Domains of the Field*. Washington: AECT.

Sugiyono. 2009. *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R&D*. Bandung: Afabeta.

Wahira. 2012. "Pengembangan Model Pelatihan Apresiasi Seni Tari Nusantara Daerah Setempat pada Guru Sekolah Dasar di Makasar". *Disertasi* Prodi Manajemen Kependidikan PPs UNNES Tahun 2012. Semarang: PPs UNNES.