DEVELOPMENT OF A TRAINING MODEL FOR CT SCAN EQUIPMENT TO IMPROVE THE COMPETENCE OF RADIOGRAPHERS

by Adi Andhika

Submission date: 30-Oct-2023 02:53PM (UTC+0700)
Submission ID: 2211733237
File name: Articel_Adi_Andhika.pdf (321.67K)
Word count: 3269
Character count: 18138

SANITAS: JURNAL TEKNOLOGI DAN SENI KESEHATAN
ISSN : 1978-8843 (*PRINT*) / 2615-8647 (*ONLINE*) **Vol. XX No. X : xx - xx**

DEVELOPMENT OF A TRAINING MODEL FOR CT SCAN EQUIPMENT TO IMPROVE THE COMPETENCE OF RADIOGRAPHERS

Adi Andhika[1)], Soeprijanto[2)], Lipur Sugiyanta[3)]

[1), 2), 3)] Jurusan Pendidikan Teknologi Kejuruan dan Vokasi, Universitas Negeri Jakarta, Jl. R. Mangun Muka Raya No.11, Rawamangun, Pulogadung, Jakarta Timur, Indonesia, 13220

E-mail: *adiandhika182@gmail.com*

ABSTRACT

Results of the author's survey in Radiology Mitra Keluarga Kelapa Gading Hospital, there is a discrepancy between the length of service of employees (Radiographers) and their career level competencies for each year, Radiographers have worked for quite a long time but their skills are still very lacking. Apart from that, the current training unorganized and undirected, giving the impression that it is just plain training. This research aims to carry out development, the development carried out is developing the current CT Scan equipment training into better training capable of increasing the competency Radiographers at Mitra Keluarga Kelapa Gading Hospital. The development model carried out is using the Dick and Carey model, where the results of this process are a CT Scan training model product called the Kyazeka training model, with the title of the book "becoming an expert CT Scan Radiographer". The product feasibility test results from experts were 86.7% for material experts, 98.2% for education and training experts and 100% for curriculum development experts. The results of the effectiveness test were obtained 79%. The Kyazeka training model is recommended for use and effective in increasing the competency of Radiographers at Mitra Keluarga Kelapa Gading Hospital.

Keywords: *Radiographer, CT Scan, Dick and Carey, Radiology*

Pengembangan Model Pelatihan Alat CT Scan Untuk Meningkatkan Kompetensi Radiografer

ABSTRAK

Berdasarkan survey yang dilakukan penulis di Radiologi Rumah Sakit Mitra Keluarga Kelapa Gading terdapat ketidaksesuaian antara masa kerja karyawan (Radiografer) dengan kompetensi jenjang karir untuk setiap tahunnya, Radiografer dengan masa kerja yang sudah cukup lama namun keterampilannya masih sangat kurang. Selain itu pelatihan yang selama ini diadakan tidak tersusun dan tidak terarah terkesan seperti pelatihan seadaanya. Penelitian ini bertujuan melakukan pengembangan, pengembangan yang dilakukan yaitu mengembangkan pelatihan alat CT Scan yang ada saat ini menjadi pelatihan yang lebih baik mampu meningkatkan kompetensi Radiografer Rumah Sakit Mitra Keluarga Kelapa Gading. Model pengembangan yang dilakukan yaitu menggunakan model pengembangan *Dick and Carey* yang mana hasil dari proses tersebut diperoleh sebuah produk model pelatihan CT Scan yang bernama model pelatihan Kyazeka, dengan judul bukunya "menjadi Radiografer ahli CT Scan". Hasil uji kelayakan produk dari para ahli yaitu untuk ahli materi sebesar 86,7%, ahli pendidikan dan pelatihan 98,2%, dan ahli pengembangan kurikulum 100%. Untuk hasil uji efektifitasnya diperoleh 79%. Kesimpulannya model pelatihan Kyazeka sangat layak digunakan dan efektif untuk meningkatkan kompetensi Radiografer Rumah Sakit Mitra Keluarga Kelapa Gading.

Kata Kunci: *Radiografer, CT Scan, Dick and Carey, Radiologi*

INTRODUCTION

Training is an activity carried out by associations, groups or organizations whose aim is to increase knowledge, skills and expertise, if the training is carried out well the results will have a positive impact on competence (Bintoro et al, 2016). According to Suaedi (2017) "the majority of medical personnel who work in health services have not received proper training, it can be seen that the health services provided are not in accordance with existing minimum standards.

Based on Suaedi's statement, the author tried to conduct a survey at Radiology Mitra Keluarga Kelapa Gading Hospital to ascertain whether this was true, based on a survey conducted by the author at Mitra Keluarga Kelapa Gading Hospital, based on data from the results of competency tests conducted annually on radiographer medical personnel. There is a mismatch between the Radiographer's work period and the competency of his career level, where Radiographers have worked for quite a long time but their skills are still very lacking. A radiographer is one of the medical personnel who has the duties and responsibilities of carrying out radiology service activities in hospitals, clinics and health centers (Kemenkes, 2020a). Radiology services are medical services whose activities use equipment that produces radiation and non-radiation (Kemenkes, 2020a). To ascertain more deeply whether the problems that occur at Radiology Mitra Keluarga Kelapa Gading Hospital are common problems that often occur in other hospitals, the author conducted a survey again at other hospitals in Jakarta, namely Mitra Keluarga Kemayoran Hospital, and Kalideres Mitra Keluarga Hospital. From the survey results, the results of the competency test were quite surprising, which of the three hospitals had the same problem, namely a mismatch between work period and career level. In this regard, it can be understood that the problem of a mismatch between work period and career level generally occurs also at home. other pain.

This problem is a serious concern for the author so that the author tries to find out why this happens, based on observations that the author has observed over several months, it is known that the training in radiology at the hospital is still carried out as is, not structured according to the rules for preparing training. For example, there is no training program plan,

no training materials, no teaching materials, and no evaluation so that learning achievements are not clear. So what Suaedi said in his research is true that medical personnel have not received proper training.

From the problems that have been expressed above, the author wants to provide a solution by searching for and reviewing various kinds of literature from previous research to see if there is anything suitable to overcome the problems that the author is facing. Based on the results of the study, several studies were obtained which became inspiration for the author to conduct research, including those in table 1.

Tabel 1. *State of The Art*

Year	Author Name and Journal	Discussion
2016	Susanto et al., Jurnal Riset Kesehatan	Basic PPR and CT Scan training to prepare Radiographer graduates
2022	Prihatin et al., Seminar Nasional LPPM Univ. Muhamadiyah Purwokerto	Education about detecting the risk of coronary heart disease through CT Calcium Score examination.
2018	Fajri & Anifah, Jurnal Teknik Elektro, Vol 7 No 3	How to detect lung cancer on a CT Scan of the Thorax (lungs) using the Fuzzy Logic method
2021	Listyalina et al., Journal of Electrical Engineering, Computer, and Information Technology	How to detect Covid-19 quickly using deep learning architecture on a CT Scan tool
2023	Researcher	Developing a CT Scan tool training model

Based on the results of a literature study conducted by the author, several studies related to CT scanning equipment were obtained, but none of the discussions discussed how to create an effective training model capable of increasing the competency of radiographers. According to Simamora (2003), an effective training model is based on a curriculum, approach and strategy that is appropriate to the learning needs of students and the problems that occur around them. Therefore, in developing the training model that the author will compile, the author began collecting data related to Radiographers such as competency standards, Radiographer professional curriculum standards, graduate profiles and learning outcomes. Due to the discrepancy in the competency test results that occurred for Radiographers, namely competency in using CT Scan equipment, this research will be limited to CT Scan equipment only.

MATERIAL AND METHODS

This research was carried out at Mitra Keluarga Kelapa Gading Hospital. The implementation time from the start of the survey to the product trial was carried out from January 2023 to September 2023. The subjects of this research were Radiographers at Mitra Keluarga Kelapa Gading Hospital which totals 10 people and Radiographers from other hospitals.

1. Development Plan

The Dick and Carey development model adopted is the Dick and Carey development model which has been simplified from 10 stages to 5 stages for the development of the CT Scan equipment training model at Mitra Keluarga Kelapa Gading Hospital, the development stages of which can be seen in Figure 1.

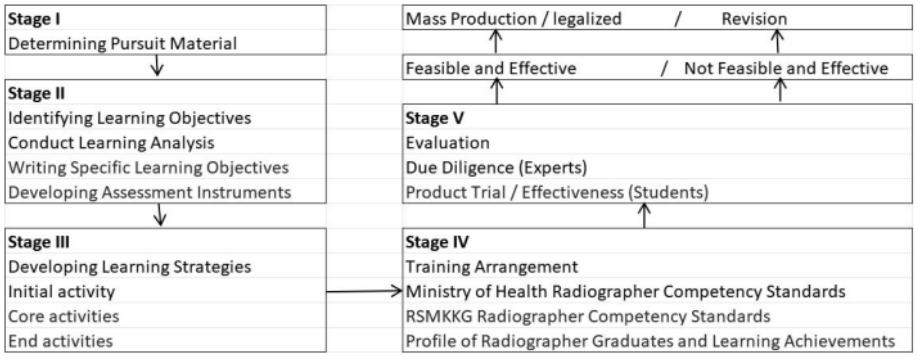


Figure 1. CT Scan Training Development Plan

2. Product Feasibility Test

This is done to find out whether the product developed is suitable for use. The instrument used for the feasibility test is a questionnaire in the form of a Likert scale which is distributed to field experts to provide an assessment of the product. Recommended field experts are material experts, education and training experts, and curriculum development experts. To obtain valid and reliable research results, valid and reliable research instruments or measuring tools are needed, this is an absolute requirement (Sugiono, 2013). From this statement, before being distributed to field experts to assess the product, the research instrument must first be tested for validation and reliability by each field expert.

3. Test Product Effectiveness

The product effectiveness test is used to measure the learning outcomes of students (Radiographers) as well as assess whether the training products created are effective or not. The method is by conducting an experiment, the experimental design that the researcher chose was pre-experimental with the type one group pretest-posttest. Pre-experimental one group pretest-posttest was carried out in just 1 experimental class where students (Radiographers) before being treated (training) were given a pretest first, after that they were given training and then after that they were given a posttest. For pre-test and post-test instruments, validation and reliability tests are carried out before being given to students To analyze research data, researchers used the SPSS program. SPSS stands for Statistical Package for The Social Sciences, originally created for the purposes of processing statistical data for the social sciences, but over time SPSS has developed so that it is not only used for processing statistical data but is also used to serve various types of uses, for example in processing production in factories, research, and others, SPSS, which was previously a Statistical Package for The Social Sciences, became a Statistical and Service Solution (Wayan, 2016). The SPSS program that the researcher used was the original SPSS 29 trial version for 30 days which the researcher uploaded directly from the official website, namely IBM. Using the original SPSS program is one way of validating and reliable statistical measuring instruments, so that the calculation results from this research are not in doubt.

RESULTS

The results of the training model development that the researchers have carried out are in the form of a CT Scan tool training model product which the researchers named the "KyaZeKa" training model. The KyaZeKa training model wants to make Radiographers experts in using CT Scan equipment, so the book is entitled "Becoming an Expert CT Scan Radiographer". The Kyazeka training model is a non-level training model (only one program) which was created to meet the needs for achieving competency in Radiographers' skills in using CT Scan equipment, both regulatory, professional and Radiographer competencies in the hospitals where they work. The hope is that by following the Kyazeka

training model, learning and training activities can run well and be directed so that the goal to be achieved, namely increasing the competency of Radiographer skills, is appropriate and fulfilled. The following is a view of the front and back covers of the KyaZeka training model book in Figure 2.



Figure 2. Front and Back Cover of the Kyazeka Training Model Book

The Kyazeka training model book contains 196 pages including the front cover and back cover. The component results of the Kyazeka training model are RPP (training program plan), learning modules, teaching materials and training evaluation questions, which with the Kyazeka training model makes it easier for Radiology department heads, trainers, lecturers and hospital training to conduct CT training Scan well where they are.

1. Validation and Reliability Test Results of Research Instruments

Table 2. Normality Test Results of Material Expert Instruments

No	Question	Significant Value	Condition	Results
1	X1	0.4	> 0.05	Normal
2	X2	0.68	> 0.05	Normal

Table 3. Normality Test Results for Education and Training Expert Instruments

Question	Significant Value	Condition	Results
X1	0.22	> 0.05	Normal
X2	0.31	> 0.05	Normal
X3	0.27	> 0.05	Normal

X4	0.75	> 0.05	Normal
X5	.12	> 0.05	Normal
X6	0.086	> 0.05	Normal
X7	0.31	> 0.05	Normal

Table 4. Material Expert Instrument Validation Test Results

No	Research variable	r count	r critical	Decision
1	Question (X1)	0,99	≥ 0,3	Valid
2	Question (X2)	0,99	≥ 0,3	Valid

Table 5. Validation Test Results of Education and Training Expert Instruments

No	Research variable	r count	r critical	Decision
1	Question (X1)	0.98	≥ 0,3	Valid
2	Question (X2)	0.86	≥ 0,3	Valid
3	Question (X3)	0.99	≥ 0,3	Valid
4	Question (X4)	0.90	≥ 0,3	Valid
5	Question (X5)	0.96	≥ 0,3	Valid
6	Question (X6)	0.90	≥ 0,3	Valid
7	Question (X7)	0.86	≥ 0,3	Valid

Table 6. Reliability Test Results of Material Expert Instruments

No	Research variable	r count	r critical	Decision
1	Question (X1)	0,986	≥ 0,6	Reliabel
2	Question (X2)	0,986	≥ 0,6	Reliabel

Table 7. Reliability Test Results of Education and Training Expert Instruments

No	Research variable	r count	r critical	Decision
1	Question (X1)	0,99	≥ 0,6	Reliabel
2	Question (X2)	0,99	≥ 0,6	Reliabel
3	Question (X3)	0,99	≥ 0,6	Reliabel
4	Question (X4)	0,99	≥ 0,6	Reliabel
5	Question (X5)	0,99	≥ 0,6	Reliabel
6	Question (X6)	0,99	≥ 0,6	Reliabel
7	Question (X7)	0,99	≥ 0,6	Reliabel

The instrument for curriculum development experts is directly validated by lecturers who are experts in curriculum development so that it is valid and reliabel.

2. Product Feasibility Test

Table 8. Product Feasibility Test Results from All Field Experts

No	Respondent	Score Percentage	Qualification
1	Materials Expert	86.7%	Very Feasible
2	Education and Training Expert	98.2 %	Very Feasible
3	Curriculum Development Expert	100%	Very Feasible

3. Product Effectiveness Test

Table 9. Effectiveness Test Results

No	Respondent	Number of participants	Effectiveness	Qualification
1	Mitra Keluarga Kelapa Gading Hospital	10 People	70%	Effective
2	Mitra Keluarga Kemayoran Hospital	13 People	85%	Very Effective
3	Combined two Hospitals	23 People	79%	Effective

CONCLUSIONS AND RECOMMENDATIONS

To develop a training model to improve Radiographer competency, a curriculum reference, competency standards, graduate profile and learning outcomes of Radiographers are very necessary, whose function is to prepare subject matter, training subjects, RPP (training program plan), learning modules, teaching materials and evaluation training.

Based on the results of the analysis that has been carried out, the Kyazeka training model is very suitable for use in Radiology at Mitra Kelapa Gading Hospital and in other Hospital Radiology.

Based on the results of the analysis that has been carried out, the Kyazeka training model is effective in increasing the competency of Radiographers in using CT Scan equipment.

The suggestion is that using the Kyazeka training model is very effective if the number of training participants is 13 participants with a percentage level of 85%.

ACKNOWLEDGEMENT

This research was conducted and supported by the Jakarta State University (UNJ), Faculty of Technology and Vocational Education.

REFERENCES

1. Ance, R. F. (2021). Prosedur Pemeriksaan CT- Scan Abdomen Kontras Pada Klinis Kanker Serviks di Instalasi Radiologi RSUD Arifin Achmad Provinsi Riau.

2. Arikunto, S., & Jabar, C. S. A. (2018). Evaluasi Program Pendidikan. In *Bumi aksara*.

3. Astuti, S. T., Wiyarno, Y., Pendidikan, T., & Pascasarjana, P. (2019). Pengembangan Modul Bordir Menggunakan Model Dick and Carey Untuk Peserta Didik Kelas XI Tata Busana SMK AL- Mujtama ' Pamekasan. *Jurnal Education and Development*, *7*(3), 13–20.

4. Budiman, A., Sabaria, R., & Purnomo, P. (2020). Model Pelatihan Tari: Penguatan Kompetensi Pedagogik & Profesionalisme Guru. *Panggung*, *30*(4), 532–548. https://doi.org/10.26742/panggung.v30i4.1370

5. Fajri, M. I., & Anifah, L. (2018). Deteksi Status Kanker Paru-Paru Pada Citra Ct Scan Menggunakan Metode Fuzzy Logic. *Teknik Elektro*, *7* no. *3*, 121–126.

6. Kaniya, T. D., & Uyun, D. (2020). CT-Scan Non Kontras Pada Pasien Batu Saluran Kemih Pendahuluan. *Jurnal Ilmiah Kesehatan Sandi Husada*, *11*(1), 284–291. https://doi.org/10.35816/jiskh.v10i2.272

7. Kemenkes. (2020a). *Keputusan Menteri Kesehatan Republik Indonesia Nomor HK.01.07/Menkes/316/2022 Tentang Standar Profesi Radiografer* (Vol. 21, Issue 1).http://mpoc.org.my/malaysian-palm-oil-industry/

8. Kemenkes. (2020b). Peraturan Menteri Kesehatan Republik Indonesia Nomor 24 Tahun 2020 Tentang Pelayanan Radiologi Klinik. *Kemenkes RI*, *3*, 1–47.

9. Kesehatan PPSDM. (2017). *Standar Kurikulum Pelatihan Jabatan Fungsional Radiografer Jenjang Ahli*.

10. Listyalina, L., Sudjono, A. W., Elektro, P. T., Yogyakarta, U. R., & Yogyakarta, U. R. (2021). Penggunaan Arsitektur Deep Learning Sebagai Salah Satu Upaya Pelatihan Deteksi Covid-19 Dari Citra Ct-Scan. *Journal of Electrical Engineering, Computer, and Information Technology.*, 28–31.

11. Nurhajati, B. (2014). Pengembangan Kurikulum Pendidikan dan Pelatihan (DIKLAT) Berbasis Kompetensi Dalam Membangun Profesionalisme Pegawai Negeri SipilL (PNS). *Pendidikan, Teknologi Surabaya, Universitas Negeri*.

12. Poltekes, D. (2018). *Kurikulum Institusi Program Studi Teknologi Radiologi*

Pencitraan Program Sarjana Terapan.

13. Prihatin, S., & Basuki, H. (2022). Sosialisasi Deteksi Resiko Penyakit Jantung Koroner Dengan. *LPPM Universitas Muhammadiyah Purwokerto*, *4*, 41–44.

14. Rizkilia Kamilah Handayati. (2018). *Perbandingan Akurasi USG dan CT Scan Tanpa Kontras Dalam Mendeteksi Batu Saluran Kemih*.

15. Simamora, L. (2003). Model-Model Pelatihan. *Academia*, 1–24.

16. Suaedi, F. (2017). Pengertian Pengembangan Kompetensi Kerja Sumber Daya Manusia dalam Rangka Meningkatkan Pelayanan di Rumah Sakit Haji Surabaya. *Jurnal Al Tijarah*, *3*(1), 79–102.

17. Suci Ingrid Daniati, R. S. M. (2019). Pelatihan Berbasis Kompetensi Pada Pelatihan Fungsional Kemetrologi. *Prosiding Seminar Stiami*, *6*(1), 101–112.

18. Sugiono, P. D. (2013). *Metode Penelitian Kuantitatif Kualitatif Dan R&D* (Alfabeta (ed.); Alfabeta). Alfabeta.

19. Sugiyono. (2007). Statistika Untuk Penelitian. In *Alfabeta* (Vol. 12, pp. 1–415).

20. Sumarno, Q., Dick, U., & Model, C. (2017). The Development Prehistoric Of Jember Tourism Module. *Jurnal Historica*, *1*(2252).

21. Susanto, E., Murniati, E., & Setiawan, A. N. (2016). Sertifikasi Keahlian Petugas Proteksi Radiasi (Ppr) Dan Ct Scan Dasar Terhadap Penyerapan Lulusan Di Dunia Kerja. *Jurnal Riset Kesehatan*, *5*(1), 45–52.

22. Suwanda, W. A. (2021). *Faktor-faktor yang berhubungan dengan kelelahan kerja pada radiografer di rsud arifin achmad provinsi riau*.

23. Wahyu Satrio Bintoro, Hadi Sunaryo, M. K. A. (2016). Pengaruh Kmpetensi Dan Pelatihan Terhadap Kinerja Tenaga Medis Puskesmas (Studi Kasus pada Puskesmas Menganti). *Riset Manajemen*.

24. Wayan, N. (2016). Modul Statitika Dengan SPSS. *STIKI Indonesia*, 1–105.

25. Yuliandra, R., & Fahrizqi, E. B. (2019). Pengembangan Model Latihan Jump Shoot Bola Basket. *Journal of SPORT (Sport, Physical Education, Organization, Recreation, and Training)*, *3*(1), 51–55. https://doi.org/10.37058/sport.v3i1.750

DEVELOPMENT OF A TRAINING MODEL FOR CT SCAN EQUIPMENT TO IMPROVE THE COMPETENCE OF RADIOGRAPHERS

ORIGINALITY REPORT

11%	11%	%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	www.neliti.com Internet Source	5%
2	e-journal.upr.ac.id Internet Source	1%
3	jurnal.peneliti.net Internet Source	1%
4	ojs.unikom.ac.id Internet Source	1%
5	ejournal.staimnglawak.ac.id Internet Source	1%
6	jurnal.fkip.unila.ac.id Internet Source	1%
7	jurnaldidaktika.org Internet Source	1%
8	www.eajournals.org Internet Source	<1%
	jiecr.org	

9	Internet Source	<1%
10	e-journal.unair.ac.id Internet Source	<1%
11	jurnal.untidar.ac.id Internet Source	<1%
12	ojs.umrah.ac.id Internet Source	<1%

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	On		