

Evaluation of a web-based curriculum resource “DocCom” by pharmacy students’ self-assessment

SHUNSUKE KURONO*, MANAKO HANYA, HIROYUKI KAMEI, YOICHI HASEGAWA

Faculty of Pharmacy, Meijo University, Nagoya 468-8503, Japan.

Abstract

Background: DocCom is a communication learning tool that was developed for medical students and residents.

Aim: The objective of this study was to assess the effectiveness of DocCom, which can be applied to practical training for pharmacy students.

Methods: A questionnaire was given to 493 pharmacy students that asked questions about their interest and level of ease in DocCom exercise, as well as whether they successfully learned about the communication skills presented.

Results: A total of 79.3% of students responded in the questionnaire that the exercise using DocCom was interesting. A significant difference was observed in the communication skill score between students who performed this exercise before and after role-play with a simulated patient (SP).

Conclusion: The present study shows that pharmacy students self-assessed this class as being an effective tool for obtaining knowledge about and learning approaches for communication.

Keywords: *DocCom, communication learning tool, pharmacy students, self-assessment*

Introduction

The six-year pharmacy education program in Japan set forth Specific Behavioural Objectives in communication in the Pharmacy Education Model Core Curriculum proposed by the Pharmaceutical Society of Japan in August 2002, as well as in the Advanced Pharmacy Practical Experiences (APPEs) Model Core Curriculum proposed by the Ministry of Education, Culture, Sports, Science and Technology in February 2004. Teaching communication skills to pharmacists during a training period is important (Arita *et al.*, 2004; Hanya *et al.*, 2005). The purpose of such teaching is the establishment of good relationships with medical staff as well as with patients and their families so that they can use medicine to perform appropriate pharmaceutical care (Teramachi *et al.*, 2011). APPEs of pharmacies at hospitals and community pharmacies have been performed since 2010. It was found that the communication skills of pharmacy students are better than those before APPEs (Otori *et al.*, 2011; Kurono *et al.*, 2012).

In Meijo University, coursework to develop basic communication competency (knowledge, skills, approach) is assigned to the first- through third-year students (Hanya *et al.*, 2009). Furthermore, the fourth-year students are provided with an experience-oriented class (preliminary clinical practice), which incorporates a role-play with a simulated patient (SP).

Role-play with an SP creates a learning environment with minimal stress, is an effective educational method for learning to communicate, and can be used as a tool for building effective communication with patients

(Nathaniel *et al.*, 2009). However, SPs are difficult to obtain in sufficient numbers because of the considerable amount of effort required to train them; thus, it can be difficult to provide students with sufficient opportunities to role-play with an SP. In addition, active learning is required for the students to develop communication competency (Young *et al.*, 2013); therefore, it is important in communication training to create and incorporate educational materials that engage the students and help autonomous learning. This involves the learner taking charge of their own learning. For these reasons, universities focused attention on DocCom (Carla *et al.*, 2009; Daetwyler *et al.*, 2010; Eugene *et al.*, 2011; Varjavand *et al.*, 2012), which was developed by the American Academy on Communication in Healthcare.

DocCom is a web-based curriculum resource that comprises 41 modules that teach communication skills. Each module comprises evidence-based recommendations, a skill improvement checklist, and a video commentary. While the target populations of DocCom are medical students and residents, these educational materials contain many subjects that are also relevant to pharmacy students, such as perspectives of healthcare professionals, how to build trusting relationships with patients, and ethical considerations. Thus, in 2011, DocCom was incorporated into the curriculum (DocCom exercise) for the first time in Japan.

In this study, students’ approach to the DocCom exercise, self-assessment on acquiring communication competency, changes in communication skills, as well as the usefulness of DocCom were investigated.

*Correspondence: Dr. Shunsuke Kurono, Faculty of Pharmacy, Meijo University, 150 Yagotoyama, Tempaku-ku, Nagoya 468-8503, Japan. Tel.: +81 52 839 2645; Fax: +81-52-834-8090. E-mail: kurono@meijo-u.ac.jp

Method

DocCom Exercise

The DocCom exercise was performed as one unit within preliminary clinical practice, which comprises three units. In the first unit, the students learned about dispensing and in the second unit about communication. In the third unit, the students performed a pharmacist simulation based on what they had learned in the first and second units. Table I shows the schedule and contents of the second unit of the exercise. In a role-play (SP exercise) with an SP, students' communication skills were verified by the SP according to the checklist shown in Table II.

Table I: Schedule and contents of the second unit for the preliminary clinical practice class

Schedule (the number of students)	Day 1	Day 2	Day 3	Day 4
I (n=189)	DocCom exercise	OTC exercise	Hospital exercise	SP exercise/ Transcript exercise/ Pharmacy exercise*
II (n=184)	SP exercise/ Transcript exercise/ Pharmacy exercise*	DocCom exercise	OTC exercise	Hospital exercise
III (n=120)	Hospital exercise	SP exercise/ Transcript exercise/ Pharmacy exercise*	DocCom exercise	OTC exercise

*SP exercise, transcript exercise, and pharmacy exercise were treated as one session given the continuity among them.

Contents and time periods allocated for the exercises (excluding the DocCom exercise)

OTC exercise (180 min)	Videocast of model examples and a commentary lecture regarding the consultation and information services related to over-the-counter drugs were conducted.
Hospital exercise (360 min)	This involved information collection from hospitalized patients, medication counseling to hospitalized patients, and observation of a role-play with an SP selected from the students. In addition, a group discussion and a commentary lecture were conducted.
SP exercise (180 min)	Regarding patient interview and medication counseling in the pharmacy setting, all students performed a role-play with an SP. The role-play by each student was recorded to create a verbatim report.
Transcript exercise (180 min)	Each student watched their own role-play with an SP, which was recorded, and a verbatim report was created. Using the created verbatim report, each student analyzed their own communication skills.
Pharmacy exercise (180 min)	Regarding information collection from patients and medication counseling to patients in a pharmacy setting, a commentary lecture was conducted. A review and commentary lecture were also conducted on the role-play with an SP.

Table II: Items to be checked on communication skills

Category	Evaluation items
Grooming and appearance	1 He/she was immaculate in white coat and clothes.
	2 His/her nails and hairstyle were appropriate.
	3 His/her name tag was in an appropriate position.
Proper posture and behavior	4 He/she behaved respectfully.
	5 He/she had appropriate eye contact.
	6 He/she spoke in voice that was easy to hear (volume, tone, speed).
	7 He/she greeted the patient.
Opening	8 He/she confirmed the full name of the patient.
	9 He/she introduced himself/herself.
	10 He/she stated the purpose of the interview/medication. He/she explained and obtained consent.
	11 He/she asked specific questions clearly.
Information collection	12 He/she interviewed in an orderly manner.
	13 He/she summarized and confirmed what was obtained by the interview, such as symptoms and wishes of the patient.
	14 He/she asked about the patient's feelings and concerns.
	15 He/she took out the drug from the medicine bag.
	16 He/she described the drug using the drug information form.
	17 He/she described the drug while confirming the patient's understanding.
Medication description	18 He/she described the drug in an easy-to-understand manner.
	19 He/she did not use technical terms.
	20 His/her wording was appropriate as a member of society.
Closing	21 He/she confirmed that he/she had not forgotten to say anything to the patient.
	22 He/she said a closing statement at the end of the interview.
Communication	23 He/she welcomed the patient warmly.
	24 He/she was in a position to hear the full story of the patient.
	25 He/she expressed full consideration of patient's feelings.
	26 His/her attitude was respectful as a medical professional.
	27 He/she responded smoothly.

For each item, the score was calculated as the number of items that the student could perform multiplied by 1 point (up to 27 points).

The DocCom exercise was performed in the second unit for 180 minutes. An original worksheet describing the module outline and tasks was used in this exercise. After being informed of how the exercise proceeded, the students performed the tasks while viewing the following two modules: "Overview of DocCom" and "Interview with the elderly." To permit iterative learning at home or on campus after the exercise had been completed, each student was given a user ID and password for DocCom.

Subjects

The 493 students from Meijo University who attended the preliminary clinical practice in fiscal years 2011 and 2012 (schedule I, 189 students; schedule II, 184;

schedule III, 120) were the subjects in this study. The students were informed prior to the study that the results throughout the analysis would not be linked with specific individuals, and that answer submission indicated their consent to participate in the study.

Study Methods

At the end of the DocCom exercise, a questionnaire was given to the subjects to rate the interest and difficulty level for this exercise, achievement of communication competency, and concerns regarding communication on a 5-point scale (Table III). Next, the results of the questionnaire, except those for two questions on the difficulty level of the exercise (No. 1, 8), were subjected to factor analysis (Principal Factor Method, Varimax method) to search for factors related to the evaluation of DocCom. Factor scores that were obtained from this factor analysis were then converted to Z-scores, which were used to categorise the students into a nonhierarchical cluster analysis (k-means method).

Table III: Questionnaire items and the aggregate results of answers (n = 470)

No. Questionnaire items	The number of responders (%)				
	I do not think so at all [1]	I do not think so [2]	I can't say yes or no [3]	I think so [4]	I think so very much [5]
1 Was the interview with elderly patients difficult?	2 (0.4%)	47 (10.0%)	70 (14.9%)	292 (62.1%)	59 (12.6%)
2 Did the interview with elderly patients interest you?	0 (0.0%)	5 (1.1%)	39 (8.3%)	293 (62.3%)	133 (28.3%)
3 Do you think that the interview with elderly patients is helpful for practical training?	0 (0.0%)	1 (0.2%)	12 (2.6%)	209 (44.5%)	248 (52.8%)
4 Were you able to acquire knowledge about the interview with elderly patients?	0 (0.0%)	11 (2.3%)	54 (11.5%)	358 (76.2%)	47 (10.0%)
5 Were you able to acquire skills for the interview with elderly patients?	1 (0.2%)	57 (12.1%)	224 (47.7%)	168 (35.7%)	20 (4.3%)
6 Were you able to acquire attitudes for the interview with elderly patients?	1 (0.2%)	19 (4.0%)	122 (26.0%)	302 (64.3%)	26 (5.5%)
7 Were your concerns about the interview with elderly patients reduced?	7 (1.5%)	60 (12.8%)	250 (53.2%)	142 (30.2%)	11 (2.3%)
8 Was the DocCom exercise difficult?	13 (2.8%)	167 (35.5%)	177 (37.7%)	107 (22.8%)	6 (1.3%)
9 Did the DocCom exercise interest you?	2 (0.4%)	5 (1.1%)	90 (19.1%)	301 (64.0%)	72 (15.3%)

10 Do you think that the DocCom exercise is helpful for practical training?	1 (0.2%)	2 (0.4%)	40 (8.5%)	282 (60.0%)	145 (30.9%)
11 Were you able to acquire knowledge about communication?	0 (0.0%)	10 (2.1%)	76 (16.2%)	336 (71.5%)	48 (10.2%)
12 Were you able to acquire skills for communication?	2 (0.4%)	42 (8.9%)	227 (48.3%)	177 (37.7%)	22 (4.7%)
13 Were you able to acquire attitudes for communication?	0 (0.0%)	15 (3.2%)	132 (28.1%)	292 (62.1%)	31 (6.6%)
14 Were your concerns about communication reduced?	7 (1.5%)	54 (11.5%)	232 (49.4%)	166 (35.3%)	11 (2.3%)
15 Do you think that the DocCom exercise is helpful for other exercises?	0 (0.0%)	6 (1.3%)	59 (12.6%)	318 (67.7%)	87 (18.5%)
16 Do you think that the DocCom exercise is appropriate as an exercise in preliminary clinical practice?	0 (0.0%)	5 (1.1%)	63 (13.4%)	307 (65.3%)	95 (20.2%)

In the SP exercise, each student was evaluated on the basis of the number of items that they performed multiplied by 1 point (up to 27 points) regarding items on the communication skills checklist verified by the SP. These scores were then used to compare student performance among schedules I–III by using the Kruskal-Wallis test, whereas the Steel-Dwass test was used as a post hoc test to compare the difference between scheduled dates. For statistical analysis, IBM® SPSS® Statistics 19 (SPSS Japan Inc., an IBM Company) and Microsoft® Excel®: Mac 2011 (Microsoft Corporation) were used. *P*-values of <0.05 were considered statistically significant.

Results

Questionnaire Results

Answers were obtained from 470 students (schedule I, 178 students; schedule II, 179; schedule III, 113; and there was 95.3% recovery). For 23 students who did not answer the questionnaire correctly, aggregation of the results was not possible. Table III shows questionnaire items and the aggregate results of the answers.

Factor Analysis

Three factors were identified by the factor analysis (Table IV). Factors 1, 2, and 3 were designated as “Evaluation as a learning tool for communication”, “Evaluation as a program for communication exercise”, and “Concerns about communication” respectively. Coefficients of determination for factors 1, 2, and 3 were 21.74%, 20.90%, and 11.05%, respectively, and 53.68% cumulatively. The Cronbach’s coefficients for factors 1, 2, and 3 were 0.86, 0.84, and 0.83, respectively.

Table IV: Results from the factor analysis on the answers to the questionnaire (n=470)

No.	Questionnaire items	Factor 1 Evaluation as a learning tool for communication	Factor 2 Evaluation as a program for communication exercise	Factor 3 Concerns about communication	Commonality
5	Were you able to acquire skills for the interview with elderly patients?	0.81	0.10	0.14	0.68
12	Were you able to acquire skills for communication?	0.70	0.15	0.25	0.58
6	Were you able to acquire attitudes for the interview with elderly patients?	0.69	0.18	0.10	0.52
13	Were you able to acquire attitudes for communication?	0.66	0.25	0.25	0.56
4	Were you able to acquire knowledge about the interview with elderly patients?	0.57	0.19	0.12	0.38
11	Were you able to acquire knowledge about communication?	0.56	0.29	0.19	0.43
10	Do you think that the DocCom exercise is helpful for practical training?	0.14	0.77	0.07	0.62
16	Do you think that the DocCom exercise is appropriate as an exercise in preliminary clinical practice?	0.20	0.73	0.14	0.59
9	Did the DocCom exercise interest you?	0.18	0.66	0.06	0.46
15	Do you think that the DocCom exercise is helpful for other exercises?	0.19	0.62	0.29	0.50
3	Do you think that the interview with elderly patients is helpful for practical training?	0.13	0.61	0.05	0.39
2	Did the interview with elderly patients interest you?	0.15	0.57	0.06	0.35
14	Were your concerns about communication reduced?	0.29	0.15	0.87	0.86
7	Were your concerns about the interview with elderly patients reduced?	0.30	0.16	0.68	0.58
	Factor contribution	3.04	2.93	1.55	7.52
	Coefficient of determination (%)	21.74	20.90	11.05	53.68
	Cronbach's coefficient α	0.86	0.84	0.83	

Factor extraction method: Principal Factor Method

Rotation method: Varimax method with Kaiser Normalization

Bold numbers denote a factor loading of ≥ 0.50 .

Nonhierarchical Cluster Analysis

Using nonhierarchical cluster analysis, the student responses were categorised into three clusters. Table V shows the number of cases in each cluster, as well as the cluster centre for each variable used. Cluster 1 comprised 165 (35.1%) students, and the cluster centres for factors 1, 2, and 3 were 0.43, 0.15, and 1.02, respectively. Cluster 2 comprised 211 (44.9%) students, and the cluster centres for the individual factors were 0.24, -0.32, and -0.65, respectively. Cluster 3 comprised 94 (23.6%) students, and the cluster centres for the individual factors were -1.30, 0.44, and -0.34, respectively.

Comparison of Scores in Communication Skills in the SP Exercise

The 470 students who answered the questionnaire (schedule I, 178 students; schedule II, 179; schedule III, 113) were compared in terms of their scores in communication skills. Mean scores \pm standard deviations for schedules I, II, and III were 21.9 ± 2.35 , 21.2 ± 2.34 , and 21.6 ± 2.89 , respectively. Significant differences among schedules I-III were revealed by the Kruskal-

Wallis test ($p < 0.01$), and a significant difference between schedules I and II was confirmed by the Steel-Dwass post hoc analysis ($p < 0.01$).

Table V: Cluster centers from the nonhierarchical cluster analysis of the factor analysis results (n=470)

	Cluster 1	Cluster 2	Cluster 3
Evaluation as a learning tool for communication	0.43	0.24	-1.30
Evaluation as a program for communication exercise	0.15	-0.32	0.44
Concerns about communication	1.02	-0.65	-0.34
The number of cases (%)	165 (35.1%)	211 (44.9%)	94 (20.0%)

Factor scores were converted to Z-scores for analysis.

Discussion

Data from students' self-assessments identify their approach to coursework and learning achievement and provide beneficial information to educators that allow them to understand the real learning status of their students, as well as help them to review learning programs and their teaching methods (Sugawara *et al.*, 2011). The present study showed that the students self-assessed the DocCom exercise as an effective tool in obtaining knowledge about and learning approaches for communication, compared with in learning communication skills. There are two plausible explanations for the high rating in acquiring knowledge: one is that DocCom uses commentary videos that allow the learned items to register more readily with the students; the other explanation involves incorporating the autonomous learning method that allows the students to address the tasks described in a worksheet while watching the commentary videos. The high attitude ratings may be associated with the video commentaries that allowed the students to watch simulated patient–doctor communications; therefore, the students were able to visualise the interview with patients in a clinical setting. On the other hand, the students may have given lower ratings to the section on acquiring skills using the DocCom exercise because the healthcare workers in the commentary videos were medical doctors, not pharmacists. In schedule I, where the DocCom exercise was conducted before the SP exercise, the scores of students in the communication skills were significantly improved. Therefore, it was suggested that the DocCom exercise may be more effective in teaching communication skills if it is performed before the experience-oriented learning by a role-play.

Questions about the level of difficulty of the exercises were excluded from the factor analysis because answers to these questions could be affected by the students' approach to academic work as well as their prior learning. In regards to the factors identified, factor 1 was designated as "Evaluation as a learning tool for communication" because it comprised questions on knowledge, skills, and attitudes, and also because it represented the evaluation of DocCom as a learning tool to develop communication competency. Factor 2 was designated as "Evaluation as a program for communication exercise" because it comprised questions about whether the exercise was useful or interesting to the students and also represented the evaluation of the DocCom exercise that included the time period allocated, choice of modules, and worksheet components. Factor 3 was designated as "Concerns about communication" because it comprised questions about communication concerns.

Nonhierarchical cluster analysis indicated that 35% of the students gave DocCom a high rating as a learning tool for communication and as an exercise tool in communication; however, the remaining 65% of the students gave it a low rating either as a studying tool or as an exercise tool.

Conclusion

For the first time in Japan, a DocCom exercise was used for communication education. The present study showed that pharmacy students self-assessed this class as being an effective tool for obtaining knowledge about and learning approaches to communication. Furthermore, students' communication skills were improved by using DocCom prior to experience-oriented training by a role-play. These results suggest that DocCom is a useful communication learning tool for pharmacy students, although it was originally developed for medical students and residents.

References

- Arita, E., Hosoya, M., Iketani, H., Iioka, T., Ideguchi, N., Ogawa, Y., Goto, K. & Yoshida, K. (2004). Nationwide Research on Communication Education Curriculum in the Faculty of Pharmaceutical Science. Second Report: Study of Communication Education Curriculum Before on-the-job Training. *Yakugaku Zasshi*, **124**, 997-1002.
- Barone, E.J., Huggett, K.N. & Lofgreen, A.S. (2011). Investigation of Student's Attitudes about Patients with Substance Use Disorders Before and After Completing an Online Curricular Module. *Annals Behavioral Science and Medical Education*, **17**, 10-13.
- Daetwyler, C.J., Cohen, D.G., Gracely, E. & Novack, D.H. (2010). eLearning to Enhance Physician Patient Communication: A Pilot Test of "DocCom" and "WebEncounter" in Teaching Bad News Delivery. *Medical Teacher*, **32**, e381-e390.
- Hanya, M., Matsuba, K. & Matsui, T. (2005). Evaluation of Communication Skills of Pharmacy Graduate Students at Meijo University and Effect of OSCE on Education. *Japanese Journal of Pharmaceutical Health Care and Sciences*, **31**, 606-619.
- Hanya, M., Kamei, H., Iida, K. & Matsuba, K. (2009). Development of Communication Education that Facilitates First-year Pharmacy Students' Respect for Patients. *Medical Education*, **40**, 445-455.
- Kurono, S., Itoh, A. & Hasegawa, Y. (2012). Self-Evaluation of the Pharmacy Students about the Learning Effect and the Feelings of Anxiety in Advanced Pharmacy Practical Experience. *Medical Education*, **43**, 193-198.
- Otori, T., Murakami, E., Kitakoji, M., Inoue, T., Kotake, T., Takada, M. & Matsuyama, K. (2011). The Improvement Item Extracted by Customer Satisfaction (CS) Analysis Evaluation on the Long-term Pharmacy Practice of 6 year-Pharmacy Students by Customer Satisfaction Analysis (CS Analysis). *Journal of Pharmaceutical Communication*, **9**, 17-26.
- Rickles, N.M., Tieu, P., Myers, L., Galal, S. & Chung, V. (2009). The Impact of a Standardized Patient Program on Student Learning of Communication Skills. *American Journal of Pharmaceutical Education*, **73**, Article 4.

Spagnoletti, C.L., Bui, T., Fischer, G.S., Gonzaga, A.M.R., Rubio, D.M. & Arnold, R.M. (2009). Implementation and Evaluation of a Web-based Communication Skills Learning Tool for Training Internal Medicine Interns in Patient-doctor Communication. *Journal of Communication in Healthcare*, **2**, 159-172.

Sugawara, A., Kobayashi, G., Moroi, Y., Suzutani, T., Fujita, T., Fukushima, T. & Ishikawa, K. (2011). Development of a Novel Self-Assessment System for the Clinical Competence of Medical Students. *Medical Education*, **42**, 201-208.

Teramachi, H., Komada, N., Tanizawa, K., Kuzuya, Y. & Tsuchiya, T. (2011). Development of Skill Scale for Communication Skill Measurement of Pharmacist. *Yakugaku Zasshi*, **131**, 587-95.

Varjavand, N., Greco, M., Novack, D.H. & Schindler, B.A. (2012). Assessment of an Innovative Instructional Program to Return Non-Practicing Physicians to the Workforce. *Medical Teacher*, **34**, 285-291.

Young, S., Griffin, B. & Vest, K. (2013). Active-learning instruction on emergency contraception counseling. *American Journal of Pharmaceutical Education*, **77**, Article 104.