INSTRUCTIONAL DESIGN AND ASSESSMENT

Professional Competencies Learned Through Working on a Medication Education Project

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Objectives. To implement a medication education project and assess the competencies students learned and implemented in professional practice after graduation.

Design. Fourth-year pharmacy students planned, carried out, and reported on a real-life project during 1 study year. Outside experts and 2 faculty members facilitated the work. The aim of the medication education project was to create material that schoolteachers could use to teach children about rational use of medicines.

Assessment. All students who had participated in the medication education program during its 3 years were contacted (n = 31). A questionnaire was sent to the 21 students who had graduated (18 responded), and a focus group was conducted with the 10 students completing their final year of pharmacy school (9 participants). The competencies that the students reported learning most were teamwork and social interaction skills. They considered the project motivating but also found it challenging and the deadlines frustrating.

Conclusions. Through participation in a medication education project, students learned interpersonal skills, time management, conflict resolution, and other skills that many of them already were finding valuable in their professional practice.

Keywords: competencies, project-based learning, team, assessment, social science

INTRODUCTION

Societal changes and changes in health care have had a great impact on the field of pharmaceutical practice and on pharmacy as a profession, making it necessary for pharmacists to possess some generic competencies. Furthermore, since pharmacists often work as managers, interpersonal competencies such as working with different people, social interaction, cooperation, and giving and receiving feedback are particularly essential.

As a part of the European Tuning Project, a large-scale consultation was organized among graduates, employers, and academics to identify the most important generic competencies needed for each of the academic fields involved.¹ As a result, 3 different types of generic competencies were distinguished: instrumental competencies, interpersonal competencies, and systemic competencies. Instrumental competencies include cognitive, methodological, technological, and linguistic abilities; interpersonal competencies encompass individual abilities

like social skills, social interaction, and cooperation. Systemic competencies include abilities and skills that involve whole systems, like a combination of understanding, sensibility, and knowledge. These generic competencies are in accordance with the ability-based outcomes that the Center for the Advancement of Pharmaceutical Education (CAPE) has recognized in the United States.²

Traditional thinking is that once you learn something at school, you can transfer your knowledge and apply it in different situations. This view, called *learning transfer*, has been challenged and some have concluded that learning is situational.³ This may be the case, especially when obtaining some generic competencies that cannot be taught. In fact, they are acquired or developed by the student or learner during the process of learning.¹ This means the traditional behaviorist approach to teaching, where students are passive listeners to information, is not sufficient; students have to be engaged as active participants in the learning process. Thus, a learner-centered constructivist approach that emphasizes students' active participation is valuable. Project-based learning is one of the methods grounded in constructivism; it supports student engagement in problem-solving situations.^{4,5}

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Furthermore, it involves a societal context and participation in a community of practice as a critical aspect of learning.^{3,6}

Project-based learning is a relatively long-term process that engages students in the investigation of authentic problems. During the project, students argue and apply information, concepts, and principles that enhance deep understanding. In project-based learning it is possible to improve competency in thinking, as the students need to formulate plans, track progress, and evaluate solutions.⁷ Thomas concludes in his review that projects are complex tasks based on challenging questions or problems that involve students in planning, problem-solving, decision-making, or investigative activities; they give students the opportunity to work relatively autonomously over extended periods of time; and they culminate in realistic products or presentations.⁴

Many new approaches and methods for improving the clinical and problem-solving skills of pharmacists, such as simulated and virtual patients, and especially problem-based learning (PBL), have been used in the field of pharmacy since the 1990s.⁸⁻¹⁰ However, the project-based learning method, which is close to but not the same as PBL, has rarely been used.^{11,12} The aim of this study was to discover what kinds of competencies students learned during their projects, and furthermore, to describe their experiences of project work as a method of university teaching.

DESIGN

Project Work in Social Pharmacy

The Project Work in Social Pharmacy course has been included in the curriculum at the University of Kuopio (since 1.1.2010 University of Eastern Finland) since a pharmacy program was started there in 1973. The topic of the project is chosen each year based on student input and the needs of the pharmaceutical society. Since 2000, the project has been carried out according to the principles of project-based learning. Fourth-year students plan, carry out, and report on a real-life project during 1 study year. The project is not planned beforehand by the teachers, but evolves on the basis of decisions that the project group makes. Moreover, the output of the project is always something that will be utilized in practice in working life. This is a required course for MSc (Pharm) students who choose social pharmacy as their major subject. The number of students varies annually between 5 and 13. At the beginning of the course, the principles of project work and teamwork methods (Appendix 1) were reviewed and common rules for faculty members acting as instructors and students exchanging feedback during the course were agreed upon. Moreover, the extent of the project, which can be 4.5-8 ECTS (1 ECTS = 27 hours of study) depending on the topic, was defined.

Project meetings were held once a month to follow the progress of the project, distribute tasks among team members, and make necessary decisions together. At these meetings, the students took turns acting as chairman and secretary. Other communication, such as giving feedback about unfinished work, took place within an e-learning system (Moodle, Moodle Pty Ltd, Perth, Western Australia). Students worked in teams of 3 or 4, with each team determining on its own how it would be organized and function. Each team had tasks related to project work (ie, writing the project plan or the evaluation report) and the chosen theme.

The students were guided by 2 faculty members. Outside experts in pharmacy or other fields (eg, medicine) were recruited according to the needs of the chosen project theme and invited to the steering group. How much they were involved depended on the project. The role of the faculty members and experts was to facilitate the work rather than to give orders to the students. Thus, they acted as group members rather than group leaders. Decisions were made by the whole project group, with faculty members intervening only if students encountered problems or were not making progress.

Evaluation of the project work included both summative and formative parts. During the project, 1 of the teams measured the progression and atmosphere of the project via a questionnaire that each project member answered. At the end of the project, the team wrote an evaluation report that included a description of the project and its outputs, a formative evaluation based on the questionnaires, and feedback to the students from the faculty members and outside experts. The evaluation report was compiled in a format typical of formal evaluation reports. The assessment of the course was on a pass or fail basis. To pass the course, the student has to work actively according to the agreed upon rules.

In 2002, the aim of the project was to create material that schoolteachers could use to teach children about rational use of medicines. This project was started because of a need in society: a new curriculum, approved in January 2004,¹³ stated that health education, including proper use of medicines, was to become an obligatory subject in Finnish junior secondary schools in 2003-2006. However, lack of teaching material was a problem.

Using information obtained from research,^{14,15} a group of 13 students created medication education material (Table 1). Additional research, in which a group of teachers (n = 14) evaluated the usefulness of the material in actual classroom situations, was conducted.¹⁶ An evaluation showed it was necessary to revise the material to make it more useful for teachers, and another group of 8 students was engaged for this task. Finally, a third group of 10 students promoted the Web site to teachers

Table 1. Creating, Developing, and Marketing the Medication Education Web Site as Project Work of Pharmacy Students

	Creating a Medication Education Web Site for Teachers, 2002-2003	Renewing the Medication Education Web Site, 2003-2004	Marketing the Medication Education Website, 2006-2007
Phase	First project group: 13 students, 3 tutors from the university, 5 primary and junior secondary school teachers	Second project group: 8 students, 2 tutors from the university, 5 primary and junior secondary school teachers	Third project group: 10 students, 2 tutors from the university, 5 primary and junior secondary school teachers
Orientation	Definition of the themes; planning based on the results of research	Familiarization with the existing web site and research results	Familiarization with the existing website and research results
Planning	Decision to create a website	Decision to simplify the structure of the web site	Decision to <ul style="list-style-type: none"> • write articles • educate teachers • market the materials through pharmacies
Implementation	Production of information about the proper use of medicines	Creation of summaries of the main points; creation of a new part about typical childhood diseases	One article in a teachers' professional journal and three articles in pharmacists' professional journals
	Creation of ideas for 15 assignments: questions for discussion, ideas for games	Creation of 27 new action-oriented assignments: steps to follow, ready-to-print forms and teaching material	Creation of educational material (Power Point presentations) for teachers; Four educational events for teachers; Attending a teachers' congress and marketing the material there
	Creation of recommendations on what to teach different-aged children about medicines ¹⁵	Conversion of the recommendations into comprehensive lesson plans	Theme week with a focus on counseling children in seven pharmacies
Evaluation	Evaluation as a part of research ¹⁶ showed a need to revise the material in order to be useful for teachers, and a decision was made to have the material renewed by the second project group.	Research showed that the assignments targeted to 7-9-year-old children are useful. ¹⁷ Positive feedback has been gained from teachers. A decision to market the material was made in order to increase awareness of the materials among teachers.	A need to conduct a nationwide survey for teachers in order to evaluate if the teachers know about the materials, and more importantly, if they have implemented it in practice.
	Topic specified beforehand by the advisors	Students chose the topic for their project	Students chose the topic for their project

Medication Education Web site available at www.uku.fi/medicinescurriculum

in Finland. These last 2 groups had a chance to choose the topic for their project in the field of medication education, whereas the topic for the first group was specified beforehand by the faculty members.

Five primary and junior secondary-school teachers served as pedagogic experts for the project, participating in the meetings and discussing and commenting in the e-learning system. Because of their participation, pharmacy students had the opportunity to observe students in primary and junior secondary schools and to incorporate what they learned in their projects. For example, the pharmacy students went to schools to observe lessons during

a normal school day. In the third project, teachers' experiences with marketing methods formed the basis on which the marketing plan was created. Thus, the teachers' participation was important for each of the projects. The Web site and its materials were made available to all teachers in Finland.

EVALUATION AND ASSESSMENT

Triangulation of 2 methods, a questionnaire and a focus group discussion, was used to assess the project's success.¹⁸ A questionnaire was sent in spring 2007 to the former students who were in the first 2 medication education project

groups, who had now graduated and were working in pharmacies or other pharmacy sectors (n = 21). It was not possible to gather these pharmacists together for interviews because they were living in different parts of Finland.

The short questionnaire introduced 16 competencies needed in working life (Table 2). The generic competencies found in the Tuning Project were applied when formulating the questionnaire.¹ The students were asked how important they considered each competency in their present work (very important, important, moderately important, not at all important, don't know). Furthermore, they were asked to rate how much of these competencies they had learned in the project course during their studies (very much, much, somewhat, not at all, don't know). The data were analyzed using SPSS software, version 14.0 (SPSS, Inc., Chicago, IL). The descriptive results are shown as frequencies and percentages. No statistical tests were used due to the small volume of data.

The students in the third project group were gathered together for 2 focus group discussions at the end of their project in April 2007 in order to get more in-depth information about using the project work method in learning. None of these students had graduated yet. Participation in the focus group discussions was voluntary and not part of their studies. One student could not participate in the discussion, so the total number of students participating was 9. One of the researchers (KH-A) acted as the facilitator during the discussions, which lasted 55 and 75 minutes.

The discussions were tape recorded and transcribed verbatim.

The focus group discussions were started by asking the students the most important skill they learned during the project. During the focus group discussions, each student was given a list of the same 16 competencies that were used in the questionnaire and asked to put them in order, placing the competency they had learned most first (1) and those they had learned least last (16). After this the discussion resumed, with students discussing why they had ranked the competencies in a particular way.

The data from the focus group discussions were thematically analyzed by 1 researcher (KH-A). The analysis unit used was a group of sentences representing an idea related to the study aim. Due to the nature of the interactive data from the focus group discussions, these analysis units represented the whole group rather than individual participants. The themes that were identified inductively in the basis of the data were: "skills needed in working life," "motivation," and "different kind of study module." Furthermore, the skills that the students reported having learned the most and the least were deductively gathered under 1 theme. The list of ordered competencies also was utilized. During the analysis, simple counting was used to make the analysis systematic and thorough.

Eighteen pharmacists responded to the questionnaire (response rate = 86%). The 3 missing responses were from the first project group. The respondents considered

Table 2. Former Pharmacy Students Assessment of the Importance of Competencies Learned in a Medication Education Project to Their Professional Work (n = 18)

Competency	Very Important, %	Important, %	Moderately Important, %	Not At All Important, %	Don't Know, %
Understanding entities	83	11	-	6	-
Social interaction skills	83	11	6	-	-
Orderliness	72	16	6	6	-
Capability to face different situations	61	33	6	-	-
Self-direction	61	33	-	6	-
Giving feedback	59	23	6	12	-
Target-orientation	53	35	6	6	-
Asking for and receiving feedback	47	35	12	6	-
Long-term working	41	47	6	6	-
Leadership	41	23	18	12	6
Project planning	38	19	31	6	6
Teamwork skills	35	53	12	-	-
Project working skills	24	41	24	5	6
Project management	23	41	18	12	6
Project leading	18	47	11	18	6
Multi-professional cooperation	17	72	11	-	-

almost all the competencies important or very important in their present work (Table 2). However, some competencies related to project work, eg, project leading and project management, were not considered that important.

The competencies that the respondents reported having acquired the most during the project were teamwork, project work, social interaction, and long-term working (Table 3). The competencies that were learned the least were leadership and project leading. Eight out of 18 respondents reported that they had not learned leadership skills at all during the project. However, another 8 out of the 18 respondents reported that they had learned such skills somewhat.

During the focus group discussions, according to the spontaneous answers to the first question, "What was the most important skill you learned during the project?," the most important skills mentioned were teamwork skills and working together with other people. They were both mentioned 4 times. Other skills mentioned spontaneously were tolerance of stress, target-orientation, importance of planning the project, patience, perseverance, project working skills, and skills in making compromises. The skills that the students reported reflected their personal characteristics. For example, a talkative student said she has recognized that people have many different perspectives and opinions that she needs to take into consideration better in the future. On the other hand, a quiet student had recognized that her opinions were taken seriously when she had dared to share them.

The competencies that were learned the most and the least, according to the list of 16 competencies placed in order by the students during the focus group discussions,

are shown in Table 4. They are similar to the questionnaire results from the first 2 project groups, ie, the 2 most-reported skills learned were teamwork skills and social interaction skills. Furthermore, the least learned skills were leadership and project leading.

The students stated they would prefer working on a team rather than alone in future professional positions. They thought sharing responsibility and getting people to participate were important and motivating. Many of the students stressed that in working life, one needs to respect different opinions and perspectives and find compromises.

Project Work as a University Study Module

The project motivated the students in many ways. According to the focus group discussions, the main motivating factor was that the outcomes of the project were "real," ie, education of schoolteachers during a school day, theme weeks in 7 pharmacies, and published articles in several journals. Through these the students realized they were capable of acting as experts, and this gave them confidence for future working life. Furthermore, the students were surprised at how excited the teachers who acted as experts during the project and the teachers who came to the education events actually were.

The students in the focus group discussions were unanimous that this study module differed from any other they had taken, and 2 respondents to the questionnaire also mentioned this. They said this kind of module was good for getting to know each other and for merging as a group of friends, which also was mentioned by 2 respondents to the questionnaire. Furthermore, they said this kind of work elicits characteristics from people that

Table 3. Pharmacists' Competencies Learned While Working on a Medication Education Project in Pharmacy School (n = 18)

Competency	Very Much, %	Much, %	Somewhat, %	Not At All, %	Don't Know, %
Teamwork skills	44	34	22	-	-
Project working skills	39	39	11	5	6
Social interaction skills	22	56	22	-	-
Long-term working	22	50	22	-	6
Orderliness	17	39	33	11	-
Project planning	11	61	6	11	11
Understanding entities	11	33	34	22	-
Project management	11	28	39	22	-
Asking for and receiving feedback	11	17	61	-	11
Giving feedback	6	22	44	17	11
Multi-professional cooperation	6	16	50	17	11
Capability to face different situations	6	11	50	22	11
Target-orientation	5	61	17	11	6
Self-direction	5	39	44	6	6
Project leading	-	16	28	50	6
Leadership	-	-	44	45	11

Table 4. Competencies Learned by Pharmacy Students From Participating in a Medication Education Project ^a (n = 9)

Competency	Most Learned Competencies, n	Least Learned Competencies, n
Teamwork skills	6	-
Social interaction skills	4	-
Project working skills	2	-
Asking for and receiving feedback	2	-
Giving feedback	1	-
Capability to face different situations	2	1
Self-direction	1	1
Target-orientation	-	1
Understanding entities	-	2
Leadership	-	6
Project leading	-	7

^a Two most learned and 2 least learned competencies from a given list of 16 competencies, which the students placed in order during focus group discussions.

normally would not come out. They also had discovered new characteristics in themselves.

The project also was considered stressful because the students could not make any firm timetables. The deadlines of other partners, eg, journal deadlines, often changed the planned timetables, which was frustrating. The project was difficult to fit in with other studies. Furthermore, it lasted throughout the autumn and spring terms, so for the students, it seemed to last forever. They were surprised at how the project seemed to be in mind all the time. This was also mentioned in the responses to the questionnaire.

DISCUSSION

The experiences of project-based learning in the course, Project Work in Social Pharmacy, were generally positive. The students regarded the course as a good way to learn how to work in a project and as a team, and they gained many generic competencies needed in working life, especially interpersonal competencies such as social interaction skills, described in the Tuning Project.¹ Since the course lasted several months, it gave the students a good idea of a long-term, target-oriented, real-life project. Such experience is important in working life and when working as a project leader in pharmacy and other fields. Furthermore, it was motivating for the students to know that their work was important (it involved getting medication education implemented in schools). Our results are in accord with results of previous studies on the

advantages of project-based learning, as well as with the results of studies done in pharmacy.^{11,19-21}

Project-based learning has its challenges as well. In our study, the students were especially frustrated about the long-term commitment needed and the tight deadlines, which changed often because of outside partners. This created uncertainty, which they had not experienced during their earlier studies. Frank and Barzilai also concluded that a learning environment that is neither structured nor organized in advance causes frustration for students because of the uncertainty created.²⁰ Furthermore, keeping deadlines has also been reported as a challenge when working on projects.²¹ However, these challenges are a part of working-life projects as well and thus made the experience even more valuable for the students. Our results also showed that if the students did not have a chance to choose the topic for their project, they were not motivated. This was the case especially during the first project year, when the topic of the project was specified beforehand by the advisors. Previous studies have reported that teamwork may cause conflicting situations if the students are not trained for it beforehand.^{19,20} Such conflicts were not reported by our students or seen by the faculty members. However, the principles of teamwork and project working methods were explained to the students at the beginning of our course, and this may have helped prepare the students for working on the project.

According to Lave and Wenger, learning in the context of social interaction is the key to becoming an expert.⁶ It is not teaching that is important, but learning through legitimate peripheral participation, which means learning by participating as a newcomer in a community of practice with the help of an “old hand.” In our projects, the faculty members and school teachers acted as the “old hands” while the students were the newcomers in the “community of practice,” which in our case was the project and teamwork environment. In fact, participating and engaging in practice rather than being an object of teaching may well be a condition for the effectiveness of learning.^{6,7}

Reflecting on our results in the context of situational learning theory,³ project-based learning created a good environment in which students learned many generic competencies needed in working life and in becoming an expert. Moreover, being part of the project as individuals and having the possibility to really contribute to how the project evolved (eg, rules were agreed on together; the project group made the decisions rather than the faculty members. Furthermore, this module did not contain any lectures or a final examination, but instead the students had to finish the tasks they had planned themselves at the beginning of the project and write a report about the project at the end.) made the students more involved in the

project, and thus, according to the situational learning theory, they most likely learned more than they would have learned by conventional teaching methods. Moreover, by participating in the project, the students became members of the community of practice, and by reproducing the knowledge they gained they may be able to use their new skills and knowledge in other projects in working life.⁶ However, the actual knowledge of the students or their ability to act in other projects cannot be shown on the basis of our results, since in this study we only examined the experiences of the students in these particular projects.

Focus group discussions are useful, especially when studying participants' experiences and attitudes.^{22,23} Interaction among the participants is the main feature that distinguishes focus groups from other types of group interviews.²⁴ Group interaction can produce unanticipated responses, and the variation in communication and interaction among participants in the focus group discussions may reveal dimensions of understanding that may remain untapped by one-on-one interviews. Limitations inherent in this method include differences in personal factors among the participants and the possible influence of the facilitator. In the present study, one of the project faculty members acted as the facilitator during the focus group discussions. However, the students gave some critical comments during the discussions, which suggests that they were talking freely about their experiences.

Triangulation of 2 methods was the strength of this study. Even though the volume of data was small, it was not a sample; all the students who were engaged in the 3 medication education projects during the 3-year period were involved (n = 31). Of this population, only 4 students did not participate in the study. Furthermore, the results obtained with the different methods are similar, indicating internal reliability. Moreover, our results are in accordance with the results from previous studies, and thus, they can be considered valid. Generalizability in qualitative research is different from generalizability in quantitative research. In qualitative research the number of respondents is usually small, as in our study. However, our aim was not to achieve generalizability of the results, but to evaluate the usefulness of the project-learning method in university teaching and describe what kinds of competencies could be gained by using it. Based on the triangulation of the 2 methods, this aim was achieved. (The medication education materials are available on the Internet at www.uku.fi/medicinescurriculum and are updated at least once a year.)

CONCLUSIONS

By participating in a project teams as part of a medication education program, pharmacy students learned

interpersonal competencies, such as teamwork and project-working skills. The projects motivated the students and taught them social interaction skills. While most considered the project stressful and were frustrated about the long-term commitment required, these challenges were also an important part of the learning process.

REFERENCES

1. Tuning project. Tuning educational structures in Europe. <http://tuning.unideusto.org/tuningeu/>. Accessed June 8, 2010.
2. CAPE Advisory Panel on Educational Outcomes. CAPE Educational Outcomes. American Association of Colleges of Pharmacy. <http://www.aacp.org/resources/education/Pages/CAPEEducationalOutcomes.aspx> Accessed June 8, 2010.
3. Lave J. *Cognition in Practice*. Cambridge: Cambridge University Press; 1988.
4. Thomas JW. A review of research on project-based learning; 2000. http://www.bobpearlman.org/BestPractices/PBL_Research.pdf. Accessed June 8, 2010.
5. Helle L, Tynjälä P, Olkinuora E. Project-based learning in post-secondary education – theory, practice and rubber sling shots. *Higher Educ*. 2006;5(2):287-314.
6. Lave J, Wenger E. *Situated Learning – Legitimate Peripheral Participation*. New York: Cambridge University Press; 1991.
7. Blumenfeld PC, Soloway E, Marx RW, Krajcik JS, Guzdial M, Palincsar A. Motivating project-based learning: sustaining the doing, supporting the learning. *Educ Psychol*. 1991;26(3):369-398.
8. Orr KK. Integrating virtual patients into a self-care course. *Am J Pharm Educ*. 2007;71(2):Article 30.
9. Ross LA, Crabtree BL, Theilman GD, Ross BS, Cleary JD, Byrd HJ. Implementation and refinement of a problem-based learning model: a ten-year experience. *Am J Pharm Educ*. 2007;71(1):Article 17.
10. Schultz KK, Marks A, Dunn BJ. Community-based collaboration with high school theater students as standardized patients. *Am J Pharm Educ*. 2007;71(2):Article 29.
11. Vander Heyden Y, Deconinck E, Vannecke C, Questier F, Van Gyseghem E, Massart DL. Skills development by project-based education in the food and diet course of a pharmacy program. *Pharm Educ*. 2007;7:235-238.
12. Petit P, Foriers A, Rombaut B. The introduction of new teaching methods in pharmacy education-II. The starting point. *Pharm Educ*. 2008;8(1):19-28.
13. Finnish National Board of Education. National Core Curriculum for Basic Education 2004. http://www.oph.fi/english/publications/2009/national_core_curricula. Accessed June 8, 2010.
14. Hämeen-Anttila K, Juvonen M, Ahonen R, Bush PJ, Airaksinen M. How well can children understand medicine related topics? *Patient Educ Couns*. 2006;60(2):171-178.
15. Hämeen-Anttila K, Juvonen M, Ahonen R, Bush PJ, Airaksinen M. What schoolchildren should be taught about medicines? -Combined opinions of children and teachers. *Health Educ*. 2005;105(6):424-436.
16. Hämeen-Anttila K, Airaksinen M, Vainio K, Bush PJ, Ahonen R. Developing a medicine education program in Finland: Lessons learned. *Health Policy*. 2006;78:272-283.
17. Hämeen-Anttila K, Honkanen L, Vainio K. The usability of medicine education assignments for seven to nine year-old children. *Health Educ*. 2009;109:491-506.

18. Denzin N, Lincoln Y. Introduction: the discipline and practice of qualitative research. In: Denzin N, Lincoln Y, eds. *Handbook of Qualitative Research*, 2nd edition. Thousands Oaks, CA: Sage; 2000: 1-28.
19. Frank M, Lavy I, Elata D. Implementing the project-based learning approach in an academic engineering course. *Int J Technol Des Ed*. 2003;13:273-288.
20. Frank M, Barzilai A. Integrating alternative assessment in a project-based learning course for pre-service science and technology teachers. *Assess Eval High Educ*. 2004;29:41-61.
21. Gülbahar Y, Tinmaz H. Implementing project-based learning and E-portfolio assessment in an undergraduate course. *J Res Technol Educ*. 2006;38:309-327.
22. Kitzinger J. Qualitative research. Introducing focus groups. *BMJ*. 1995;311:299-302.
23. Steward D, Shamdasani P. *Focus Groups, Theory and Practice*. Newbury Park: Sage; 1990.
24. Kitzinger J. The methodology of focus groups: the importance of interaction between research participants. *Sociol Health Illn*. 1994;16:103-121.

Appendix 1. Principles of Project Work and Teamwork Methods Followed in the Course, Project Work in Social Pharmacy

Individual work: Each student has to work actively according to rules agreed on together and do the tasks that the project group or team assigns to him or her. Each student sets his or her own personal goals and does some orientation tasks involving the project and teamwork.

Teamwork: Teams are independent; they agree on their own way of working. Each team has a specific sphere of responsibility, but it also has a mandate to make decisions within its sphere of responsibility.

Project work: Project meetings are held once a month. Decisions are made together as are rules on how to give feedback and act as a project member. Tasks are shared by the teams. Each student acts as chairman and secretary at least once during the project.