# The Use of a Reflective Logbook to Facilitate Dynamic Evaluation of Activities in a Group Project

Gireesh V. Gupchup
Holly L. Mason
Margaret Foss

ABSTRACT. The ability to reflect on problems and assess perfor-
mance in activities is an important asset for pharmacy students to
possess. Through active reflection, new ways of thinking about and
dealing with problems can be realized. This study gave pharmacy
students an opportunity to learn through reflection, by maintaining a
reflective logbook to facilitate dynamic evaluation of activities car-
ried out in a group project. Results from the Logbook Benefit Survey
(LBS), constructed to determine how beneficial the reflective log-
book was perceived to be by students, provide evidence that the
logbook was beneficial in many respects. The Logbook Scoring
Rubric (LSR) was also constructed to give an indication of the num-
ber of content dimensions addressed by the students in their log-
books. Combined results from the LBS and the LSR show that many
students used the reflective logbook as an invitation to reflect on and
evaluate the activities during the group project, thus promoting self-
directed learning. *[Article copies available from The Haworth Document
Delivery Service: 1-800-342-9678.]*

Gireesh V. Gupchup, M.S., is a doctoral student in Pharmacy Administration
and Holly L. Mason, Ph.D., is Professor of Pharmacy Administration, at the
School of Pharmacy and Pharmacal Sciences, Purdue University, West Lafayette,
IN 47907. Margaret Foss, Ph.D., is affiliated with the Department of Educational
Psychology, Purdue University, West Lafayette, IN 47907. The authors would
like to thank Dr. Robert K. Chalmers, of the Department of Pharmacy Practice,
Purdue University, and two anonymous reviewers for their helpful suggestions on
an earlier version of this article.

47

## INTRODUCTION

While commenting on the advantages of using portfolios in an educational curriculum, Paulson and Paulson stated: "Through building a portfolio, students have the opportunity to learn-to learn about a subject, to learn about learning, to learn to make choices and judgments, and to learn about themselves." (1) It is evident from this statement that more important than the things that are placed in a portfolio, is the process of putting them there.

"A portfolio is a file or folder containing a variety of information that documents a student's experience and accomplishments. The portfolio can contain summary descriptions of accomplishments, official records and diary items."(2) A critical dimension that the portfolio lends to education is the reflective learning process. By reflecting on activities carried out during an exercise, students have an opportunity to evaluate what, and how, they have learned. This effectively equips them to assess themselves as learners by using higher order thinking and metacognitive skills (1).

Schulman proposed a conceptual model of teaching, called the Model of Pedagogical Reasoning (3). Reflection, "the process of reviewing, re-enacting and analyzing one's performance and grounding explanations in evidence," is a component of this model. In essence, this is a process of learning from experience. Through the process of active reflection students can generate new ways of thinking about and dealing with problems. This process is referred to as reflection-in-action, and has been recognized as an important aspect of education in the health professions (4).

Thoughtful assessment of performance in activities important to achieving a set goal is extremely important to health professionals, including pharmacists. Portfolios have been useful as a vehicle for reflective writing and inquiry into specific problems in nursing and physical therapy education (4,5). Pharmacy students also need to be equipped with the ability to reflect on problems that they will encounter in real professional practice. The literature, however, lacks any documentation of an effort in this direction. This project represents an attempt to implement and evaluate the use of a reflective logbook designed to facilitate dynamic evaluation of activities carried out in a group project[1]. The group project was to culminate in the production of a promotional videotape.

## OBJECTIVES

The first objective of this study was to give a group of pharmacy students an opportunity to reflect-in-action by maintaining a reflective

logbook. Secondly, the perceived benefit of maintaining a reflective log-book needed to be determined. Finally, an evaluation of the content of the logbooks, through the aid of a scoring rubric needed to be carried out.

## METHODS

As part of the requirement for their recitation grade, second-year pharmacy students enrolled in a pharmacy administration course worked in groups of four or five to complete a set of assignments. During the course of the semester each group was required to critique a newspaper advertisement for a pharmacy, critique a newspaper or journal article about a pharmacist or a pharmacy, and critique two advertisements for prescription drugs within the same product class. In addition, each group developed a promotional videotape for a hypothetical drug product, pharmacy, or pharmacy service, drawing on concepts encountered during the lectures or recitations and the assignments mentioned previously. The goal of these assignments was to improve the students' group interaction skills while solving project related problems as well as giving them an opportunity to become aware of methods used to promote drug products, pharmacy services, and the pharmacy profession. However, the present study focuses on the opportunity given to students to actively reflect on the activities involved in the group project by maintaining a reflective logbook.

The study sample was comprised of 31 students enrolled in a recitation section taught by the primary author. This section represented one of six overall course sections. The students were asked to maintain logbooks/diaries to track their progress in the group project. These logbooks were intended to be a vehicle for the dynamic evaluation of the activities that the students carried out during the project. A note explaining the purpose of the logbook exercise and clarifying questions received from the students (after verbal instructions were given to maintain the logbook), was handed to them four weeks into the semester (Appendix A). The logbooks were collected in week 10 of the semester for a midterm evaluation (Phase I). They were returned to the students the following week, and collected again at the end of the semester for the final evaluation (Phase II, week 15). The only aspect of the group project grade that the logbook entries were used for was in determining the differential effort expended on the project by students in a group.

To study the perceived benefit of maintaining a reflective logbook, the Logbook Benefit Survey (LBS) was constructed. The LBS consists of seven items on a five point Likert-type scale ranging from 1 or "strongly disagree" to 5 or "strongly agree." These items were selected for inclu-

sion based on the benefits that were intended to accrue from the logbook exercise. The intended benefits were also explained to the students verbally as well as through a memo, as mentioned earlier. Space was also provided for comments on the logbook exercise. The LBS was administered to the students at the time of the mid-term logbook collection (Phase I), as well as the second collection (Phase II).

Frequencies were obtained for the number of responses to the five choices on each item (strongly disagree to strongly agree). Visual analysis revealed very few responses in the "strongly disagree" and "strongly agree" categories. Therefore, the "strongly disagree" and "disagree," and the "strongly agree" and "agree" categories were collapsed to give three response categories, "Disagree," "Undecided," and "Agree." Cronbach's alpha values for both phases of the LBS administration were 0.92 (item 7 reverse scored), indicating a high degree of reliability. Chi-square statistics, to determine a change in the proportion of frequencies to the three responses from Phase I to Phase II and standardized residuals (R), to determine the contribution of each category to a significant chi-square statistic, were calculated for each item (6).

To aid in the evaluation of the logbook contents the Logbook Scoring Rubric (LSR) was constructed (see Appendix B). The LSR score gives an indication of the number of content dimensions (from the LSR scoring list) that a student has included uniformly in his/her logbook. The scoring list was based on the instructions given to students regarding the contents of the logbook through the memo explaining the purpose of the exercise (Appendix A). The six-point scale is not continuous, and a LSR score does not technically indicate the level of cognitive effort or analytic complexity that a student has utilized while compiling the reflective logbook. It is important to note that the LSR was not given to the students since we wanted them to use their own abilities to document in their logbooks whatever they perceived to be pertinent. By giving the students the LSR, it was felt that we would be deliberately standardizing the logbook entries. This was not our intention. The logbook is a very individualized document, and we did not want to standardize entries beyond a certain limit. Therefore, it was felt that the guidelines that were given through the memo and the verbal instructions were sufficient.

For Phase I, 15 (from a total of 31) logbooks were randomly selected and scored by the three authors. For Phase II, 26 logbooks were scored by two of the authors for entries made after Phase I (5 students made entries after Phase I indicating that their project was completed, and hence their logbooks were not scored).[2] Spearman rank-order correlation coefficients and Kendall's coefficient of concordance *(W)* were calculated to determine

the interjudge reliability of the LSR scores for both Phase I and Phase II
(7). All data analyses were performed using the SPSS-X software package
(7).

## RESULTS AND DISCUSSION

### The Logbook Benefit Survey (LBS)

The question to be answered here was: How beneficial was the logbook
exercise perceived to be, by the students? To help answer this question, the
Logbook Benefit Survey (LBS) was administered after the Phase I (n =
30) and Phase II (n = 31) logbook collections. Responses to the LBS are
presented in Table 1. In Phase I, 50 percent or more of the students agreed
that the logbook/diary was beneficial in analyzing the usefulness of each
activity carried out by the individual student during the group project
(56.7%, n = 17), and that it helped as a learning tool in making the student
aware of his/her capabilities to work in a group (50%, n = 15). Responses
to these two questions were consistent in that the Phase II administration
also revealed similar results (64.5%, n = 20; and 51.6%, n = 16, respec-
tively). In addition, the Phase II results showed that 64.5% (n = 20) of the
students felt that the logbook/diary was both a good method of tracking
how each activity in the group project benefitted them personally, and
helpful in analyzing the usefulness of the activities carried out by other
members of the group.

There was a significant difference in the proportion of frequencies in
Phase I and Phase II on items 2, 3, and 5 (significant Chi-square, Table 1).
The standardized residuals showed that the percentage of students that were
undecided as to whether the logbook/diary was useful in helping them give
their group positive input increased significantly from 13.3% (n = 4) to 29%
(n = 9) (Item 2). On the other hand, the percentage of students that felt that
the logbook/diary was a good method of tracking how each activity in the
group project benefitted them personally increased significantly from 40%
(n = 12) to 64.5% (n = 20). This was due to a significant decrease in the
number of students that were undecided about this issue in Phase I (Item
3). There was also an increase in the percentage of students that felt that
the logbook/diary was helpful in analyzing the usefulness of the activities
carried out by other members of the group (40%, n = 12 to 64.5%, n = 20;
Item 5).

The consistent opinions of students regarding the benefits of the log-
book/diary in analyzing the usefulness of each activity carried out by the

TABLE 1. Responses on the Logbook Benefit Survey and chi-square results for change in responses[a]

| Item | Response | Phase I n | Phase I % | Phase II n | Phase II % | R[b] |
|---|---|---|---|---|---|---|
| 1) The diary was useful in giving me a sense of direction while carrying out my duties in tile group project | | | | | | |
| | Disagree | 14 | 46.7 | 12 | 38.7 | -0.65 |
| | Undecided | 6 | 20.0 | 7 | 22.6 | -0.32 |
| | Agree | 10 | 33.3 | 12 | 38.7 | 0.52 |
| | $\chi^2 = 0.799$ | | | | | |
| 2) The diary was useful for me to help me give my group positive input during the group project | | | | | | |
| | Disagree | 12 | 40.0 | 11 | 35.5 | -0.40 |
| | Undecided | 4 | 13.3 | 9 | 29.0 | 2.40[c] |
| | Agree | 14 | 46.7 | 11 | 35.5 | -0.90 |
| | $\chi^2 = 6.762*$ | | | | | |
| 3) Maintaining a diary is a good method of tracking how each activity in the group project benefited me personally | | | | | | |
| | Disagree | 8 | 26.7 | 8 | 25.8 | -0.10 |
| | Undecided | 10 | 33.3 | 3 | 9.7 | -2.28[c] |
| | Agree | 12 | 40.0 | 20 | 64.5 | 2.16[c] |
| | $\chi^2 = 9.862**$ | | | | | |
| 4) By maintaining a diary I could analyze the usefulness of each activity that I carried out during the group project | | | | | | |
| | Disagree | 7 | 23.3 | 6 | 19.4 | -0.45 |
| | Undecided | 6 | 20.0 | 5 | 16.1 | -0.48 |
| | Agree | 17 | 56.7 | 20 | 64.5 | 0.58 |
| | $\chi^2 = 0.773$ | | | | | |
| 5) By maintaining a diary I could analyze the usefulness of the activities carried out by other members of the group | | | | | | |
| | Disagree | 10 | 33.3 | 6 | 19.4 | -1.35 |
| | Undecided | 8 | 26.7 | 5 | 16.1 | -1.14 |
| | Agree | 12 | 40.0 | 20 | 64.5 | 2.16[c] |
| | $\chi^2 = 7.765*$ | | | | | |
| 6) The diary helped as a learning tool in making me aware of my capabilities to work in a group | | | | | | |
| | Disagree | 13 | 43.3 | 10 | 32.3 | -0.93 |
| | Undecided | 2 | 6.7 | 5 | 16.1 | 2.03 |
| | Agree | 15 | 50.0 | 16 | 51.6 | 0.13 |
| | $\chi^2 = 5.003$ | | | | | |
| 7) The diary was a waste of time | | | | | | |
| | Disagree | 9 | 30.0 | 11 | 35.5 | 0.56 |
| | Undecided | 10 | 33.3 | 11 | 35.5 | 0.21 |
| | Agree | 11 | 36.7 | 9 | 29.0 | -0.70 |
| | $\chi^2 = 0.852$ | | | | | |

a Phase I: N = 30, Phase II: N = 31
b R = Standardized Residual (for computation of R see Hinkle, Wiersma, Juts 1988:556)
c Indicates a significant Standardized Residual
* $p < 0.05$: ** $p < -0.01$

individual student (Item 4), and as time progressed (Phase II) in analyzing the usefulness of the activities carried out by other members of the group (Item 5) was an encouraging observation. Probably explaining this result, in the space given for the comments in the LBS, one student wrote: "I like writing the diary to reflect upon whether or not my group has become a community or if it is merely a task-oriented pseudocommunity."

A majority of the students (50% or more) were consistent in their opinion that the logbook/diary helped as a learning tool in making them aware of their capabilities to work in a group (Item 6). This result seemed to tie in with the fact that as time progressed (in Phase II), there was a significant increase in the percentage of students that felt that the logbook/diary helped to track the benefit of each activity to the individual (Item 3). A comment by one student about the logbook seemed to bear evidence to this finding. The student wrote: "Didn't like it at first, but later it proved to be beneficial. Keeping a diary was useful in making me aware of the usefulness of all the activities conducted."

Also evident from Table 1 was the fact that there were a number of "Undecided" responses on all the items of the LBS. An insight into this ambiguity can be obtained from the comment of one student: "I don't get the meaning of it. It was not very clear to me what I was supposed to put in the log." The same student suggested setting up more specific guidelines to help increase the beneficial effect of the logbook.

There were some students who felt that the logbook was not useful (Item 7). Comments to this effect were: "It was more a waste of time than anything else" and "The logbook is more trouble than its worth. We don't need to write down our plans." This suggests that an attempt would need to be made to help students who do not understand the value of reflective thinking and writing in the planning process, were a reflective logbook exercise to be implemented in a curriculum.

### The Logbook Scoring Rubric (LSR)

The number of content dimensions that were addressed in a uniform fashion in each student's logbook was assessed with the aid of the LSR. The interjudge reliability for Phase I and II scores on the LSR are presented in Table 2. Spearman rank-order correlations and Kendall's coefficient of concordance ($W$), which ranges from 0 to 1 (1 signifying complete agreement), were used to evaluate interjudge reliability (7). Three judges scored 15 randomly selected logbooks at the midterm collection (Phase I)[3]. The Spearman rank-order correlation coefficient for pairs of judges ranged from 0.71 to 0.81, and the Kendall's coefficient of concordance ($W$), an indication of agreement among judges, was 0.851 ($p = 0.001$). In

TABLE 2. Spearman correlation coefficients and Kendall coefficient of concordance indicating interjudge reliability for the Logbook Scoring Results.

| PHASE I (n = 15[a])<br>Number for Judge | 1 | 2 | |
|---|---|---|---|
| 1. Judge 1 | | | |
| 2. Judge 2 | 0.81** | | |
| 3. Judge 3 | 0.81** | 0.71* | |
| PHASE II(n = 26[b])<br>Number for Judge | 1 | 2 | |
| 1. Judge 1 | | | |
| 2. Judge 2 | 0.61** | | |
| Kendall *W* | $\chi^2$ | df | p |
| PHASE I = 0.851 (Judges = 3) | 35.72 | 14 | 0.001 |
| PHASE II = 0.806 (Judges = 2) | 40.28 | 25 | 0.027 |

[a] 15 logbooks were randomly selected from a total of 31.
[b] 5 students made entries after Phase I indicating that their project was completed, and hence their logbooks were not scored.
* $p < 0.001$
** $p < 0.0001$

Phase II (final collection), two judges rated 26 logbooks. The Spearman rank-order correlation was 0.61, with a Kendall's *W* of 0.806 ($p = 0.027$). These results bear evidence as to the reliability of scores on the LSR in both phases.

A rough indication of the number of dimensions (from the five-item LSR scoring list, Appendix B) addressed in the logbook entries can be obtained from the median scores. In Phase I the median score was 2, and in Phase II it was 3. These scores only give us an idea of the number of dimensions addressed in the logbooks, and not necessarily the level of cognitive effort or degree of analytical content. A more holistic and analytic rubric would be needed for the latter purpose. It is possible that the increase in the median score in Phase II may have been due to the fact that by responding to the LBS at the end of Phase I some students got a better realization of how the logbook could be used more effectively.

*Excerpts from Logbooks*

In many cases, the logbooks charted a personal story of progress through learning, frustration, and satisfaction. The logbooks outlined how the students became aware of their capabilities to work and interact effec-

tively in groups. The following are chronological excerpts from one student's logbook:

> So far we really have not made much progress. It is nice working with a group, though. It forces you to interact with others and get to know other people with their own unique ideas.

> I do feel we are making progress, although I do wish we were further along. I am beginning to feel confident with my group.

> Today we got quite a bit accomplished. We decided to advertise our pharmacy, "Caremore Pharmacy," where pharmacists have time to counsel patients on the use of their medications. We also want to show that patients save money at this pharmacy by obtaining generic instead of brand name drugs.

> Today I feel very comfortable, now that we have rehearsed and know exactly what will happen and when it will happen.

> This project has helped me to get to work with others and to get involved. Sharing our ideas and making decisions as a whole is a big accomplishment.

Another student summed up the group project experience:

> In a way we shared in something very special, because although people can see our final product, our video, no one really knows the processes, smiles, laughs, even angry words and gestures of frustration that comprised making our video; and for that we have an edge.

## CONCLUSIONS AND RECOMMENDATIONS

A stakeholder in a portfolio has been defined as one who feels personal involvement in the evaluation process of the portfolio. The primary stakeholder is one who assembles, and therefore owns the portfolio (8). Similarly, in the present study, each student was the primary stakeholder in his/her reflective logbook. The evaluation of the benefits of the reflective logbook are therefore the best measure of its "validity." Though there were some students who did not find the reflective logbook useful, there was evidence that it was beneficial in many respects. Both the Logbook

Benefit Survey (LBS), and the Logbook Scoring Rubric (LSR) showed good reliability as a measure of the benefits of the logbook, and as an indication of the number of content dimensions included in the logbooks, respectively.

As indicated earlier, the only aspect of the group project grade that the logbook entries were used for was in determining the effort expended on the project by each student. One must recognize that more important than using the logbooks as a part of the grade is the process that the students go through in building the logbook. It helps them reflect on and analyze their abilities (1). This in itself has profound implications for the individual student's future.

Based on the overall successful implementation of the reflective logbook exercise and the perceived added learning value to the student, plans are being developed to use reflective logbooks in all sections of the project course. Experience gained from this initial effort is leading to refinements in the logbook guidelines, assessment process, and student feedback.

A few recommendations can be made to improve upon the limitations of this study. One of the major drawbacks was the lack of feedback given to students about their reflective logbooks. Though verbal instructions and an explanatory note were given to the students at the beginning of the semester, only those students who voluntarily asked questions about the logbook were helped. Additionally, as mentioned earlier in the methods section, in an attempt to avoid standardizing the logbook entries it was felt that these instructions were sufficient. However, judging from the students' comments it seems that if a reflective logbook exercise were to be incorporated into a curriculum, more detailed guidelines based on the outcomes desired would need to be made available to the students. Based on these guidelines, individualized feedback about how students could use the logbook to their advantage as a learning tool should be given based on content at every evaluation (collection).

The LSR did not measure the cognitive effort and analytic complexity involved in compiling the logbooks. A revised rubric that provides for both holistic and analytic evaluation would give a better assessment of the reflection-in-action accomplished by the student. Based on the purpose it would be beneficial to include exhibits of the student's work in the reflective logbook, expanding it to a true portfolio. This would give educators and individual students a more coherent picture of progress.

In summary, the results of this study show that the reflective logbook exercise seemed to invite students to reflect on, and evaluate their activities during the group project, thus promoting independent and self-directed learning of the skills required to interact effectively in a group.

## NOTES

1. The collection of students' reflections were referred to as logbooks rather than portfolios in this study since most conventional definitions of portfolios include exhibits of students' efforts in addition to self-reflection (1,2). This would mean, for example, including notes or rough drafts of materials developed for the group project. Since only student reflections and documentation of activities were collected, it was considered more appropriate to call this collection a reflective logbook. The terms logbook, diary, and reflective logbook are used interchangeably to refer to the reflective logbook maintained by the students in this study.

2. In Phase I, since one of the authors had time constraints and could not score all the logbooks, it was believed that scoring 15 logbooks (from a total of 31) would be adequate. Therefore, 15 randomly selected logbooks were scored in this phase. We feel it is important to include the results of this author, especially since she is an educational psychologist experienced in studies of this type.

3. Dr. Foss left Purdue University prior to the scoring of the logbooks in Phase II, and therefore only two authors scored the logbooks in this phase.

## REFERENCES

1. Paulson FL, Paulson PR. The ins and outs of using portfolios to assess performance. Paper presented at the Joint Annual Meeting of the National Council of Measurement in Education and the National Association of Test Directors. Chicago, IL: 1991 Apr 4-6; ERIC publication no. ED 334250.
2. Archbald DA, Newmann FM. Beyond standardized testing. Assessing authentic academic achievement in the secondary school. Reston, VA: National Association of Secondary School Principals, 1988:29.
3. Shulman LS. Knowledge and teaching: foundations of the New Reform. Harvard Educ Rev. 1987; 57(1):1-22.
4. Jensen GM, Saylor C. Portfolios and professional development in the health professions. Paper presented at the Annual Meeting of the American Educational Research Association (AERA). Atlanta, GA: 1993 Apr 16; ERIC publication no. ED 358148.
5. Oechsle L, Volden C, Lambeth S. Portfolios and RNs: an evaluation. J Nurs Educ. 1990; 29(2):54-9.
6. Hinkle DE, Wiersma W, Jurs SG. Applied statistics for the behavioral sciences. 2nd ed. Boston: Houghton Mifflin, 1988:556.
7. SPSS-X user's guide, 3rd ed. Chicago, IL: SPSS Inc.; 1987.
8. Paulson FL, Paulson PR. The making of a portfolio, 1991; ERIC publication no. ED 334251.

## APPENDIX A

### NOTE TO STUDENTS EXPLAINING THE PURPOSE OF THE LOGBOOK

From:   GVG
To:     Thursday 12:30 pm Recitation students (Spring '94)
Date:   2/3/94

If you remember, I mentioned two weeks ago that you will be keeping a diary that tracks your progress in the group project. This is just a little note to explain what this logbook is all about.

After every meeting that you have with your group members, I would request you to write down what you discussed during the meeting. Additionally, you should write what you feel about your progress with the project. Include a few lines on how you feel the whole exercise of the group project is benefiting you. If you think something could have been done in another way to benefit both you and your group better, include that, too.

This is basically a method whereby you can continually evaluate your own progress in the project. Later on in the semester, you will be filling out an evaluation pertaining to your project. However, that will only be a one-point-in-time evaluation. The diary will give you an opportunity to do a continuous evaluation.

There is a lot of work that all of you put in to your project. This logbook will give you an opportunity to evaluate the benefit of the activities that you perform to make the project a success. I will certainly read these logbooks, and keep your comments in mind while grading your projects. I also plan to give you feedback on your comments. The only rule: "Anything goes." (Each entry in the diary can be as long or short as you wish it to be.)

GOOD LUCK WITH YOUR PROJECTS!

## APPENDIX B

### THE LOGBOOK SCORING RUBRIC

Points are assigned to the portfolios based on the following scoring rubric:

0 - None of the points that are included in the scoring list are contained uniformly through the portfolio

1 - One point included in the scoring list is contained uniformly through the portfolio

2 - Two points included in the scoring list are contained uniformly through the portfolio

3 - Three points included in the scoring list are contained uniformly through the portfolio

4 - Four points included in the scoring list are contained uniformly through the portfolio

5 - Five points included in the scoring list are contained uniformly through the portfolio

### SCORING LIST

a. Student records activities during the meetings

b. Student records future activities that are going to be carried out

c. Student records the completion or non completion of activities and/or with an assessment of them (e.g., why an activity was not carried out, or the satisfaction or dissatisfaction with a completed activity)

d. Student mentions the benefits and/or drawbacks of the activities or meetings to the group and/or himself/herself

e. Student presents an analytical progress report of how or why the activities benefitted and/or adversely affected the group (e.g., group dynamics) and themselves while carrying out the project