INSTRUCTIONAL DESIGN AND ASSESSMENT

Enhancing Academic Success by Creating a Community of Learners

Lynette Moser, PharmD,[a] Helen Berlie, PharmD,[a] Francine Salinitri, PharmD,[a] Micah McCuistion, PharmD,[b] Richard Slaughter, MS[a]

[a] Wayne State University, Detroit, Michigan
[b] Kroger Corporation, Texas

Objective. To enhance academic performance and student progression by creating a community of learners.

Design. Academic performance and student progression of students participating in the first 3 years of a second-year pharmacy learning community were compared with those of students in the 3 previous classes. Students participating in the learning community completed surveys at the end of each semester and at the end of the academic year. Peer mentors were surveyed at the end of the academic year.

Assessment. After implementing the learning community, failures during the second year of the pharmacy program decreased. Students had increasingly positive perceptions of the experience over the 3 years. Peer mentors rated their overall experience highly.

Conclusion. Implementation of a learning community resulted in improved progression through the program and was well received by students.

Keywords: academic success, learning community

INTRODUCTION

In an effort to promote academic success, the current Accreditation Council for Pharmacy Education (ACPE) Standards require schools to make programmatic adjustments to curb trends of attrition and to provide individualized assistance to students with academic difficulty.[1] The revised ACPE 2016 guidelines contain similar language for identifying and intervening when students have academic difficulty.[2] The basis for addressing interventions to support programmatic success is rooted in the ACPE educational outcome standards that focus on skills related to communication, critical thinking, problem solving, professionalism, and collaboration.[1,2] Using pedagogical designs that develop these skills can enhance student success.[3] A learning community is an educational method rich with opportunities for students to strengthen these skills.

The theoretical framework for the learning community was derived from the social constructivist philosophy.[4-6] In this setting, students construct knowledge through social interactions and negotiation by engaging in meaningful activities. Bielaczyc and Collins outline 4 key characteristics of a learning community framework:

(1) diversity of expertise in the group, (2) a shared objective to construct knowledge within the group, (3) emphasis on the process of constructing knowledge, and (4) methods for sharing knowledge within the group.[7] Members of a learning community can include students enrolled in several common courses or linked by a commonality related to their major.[8] However, these common characteristics of learning communities can be applied in a broad manner, resulting in learning communities with diverse structures.

Within higher education, learning communities provide organized learning support with the overall goal of enhancing the academic experience and improving academic performance.[3,9] Schools may use a learning community to introduce incoming students to the expectations of university life and to serve as a social support structure as students transition from high school to college. Learning communities socialize students to the expectations of a certain program of study as a result of exposure to upper classmen and increased interactions with faculty members. The structure and function of learning communities can be complex, the most complex being intensely coordinated programs that incorporate faculty members, student mentors, and prescribed activities linked to an entire curriculum. An informal group of students working together as they study are also considered a learning

Corresponding Author: Lynette Moser, PharmD. 259 Mack Avenue, Suite 2190, Detroit, MI 48201. Tel: 313-577-0115. Fax: 313-577-5369. E-mail: lynette.moser@wayne.edu

community.[10] Despite varying structures, outcomes have been positive with improvements seen in student retention, student achievement, and student progress.[10]

Learning communities exist in undergraduate, graduate, and professional programs such as medicine, nursing, and pharmacy.[11-17] In professional programs, they are designed to achieve a variety of specific outcomes. Several medical schools describe learning community models that include faculty members and students from all years of the program.[11-13] These programs create longitudinal advising relationships between faculty members and students and offer opportunities for students to demonstrate and develop their leadership skills.[11] Several nursing programs describe learning communities that focus on improving student retention and team effectiveness during clinical practice experiences.[14,15] Within pharmacy programs, they are incorporated into orientation programs to promote a sense of community and to familiarize students with program expectations.[15] Learning communities in a medicinal chemistry course integrated practicing clinicians and group activities to increase student comprehension and motivation.[17] The offering of LCs in health professions schools is dictated by each school's needs. This paper describes the learning community adopted within the doctor of pharmacy (PharmD) program at Wayne State University (WSU) that incorporated peer mentoring to enhance academic success within the program.

DESIGN

The pharmacy curriculum at WSU incorporates foundational sciences, patient care skills, and literature evaluation skills during the first year. The second and third years of the curriculum continues with patient care skills and adds integrated pharmacotherapeutics modules with a component of problem-based learning (PBL). Introductory pharmacy practice experiences (IPPEs) as well as social and administrative sciences courses are taught throughout these 2 years. Assessment of academic performance (failure rates, program retention, and on-time graduation rates) revealed that the second professional year (P2) was particularly difficult for students. Course failure rates in this year are historically higher than in any other year of the 4-year PharmD program. This year is challenging because it introduces students to PBL, integrated pharmacotherapeutic modules, and experiential training, all of which impart a high volume of information and expectations for application and synthesis.

The learning community is a mandatory program offered throughout the P2 academic year; participation is an expectation of the Doctor of Pharmacy Professionalism Curriculum. The class is divided into groups of up to 15 students and each is guided by a peer mentor. The learning community is introduced to P2 students during a day-long orientation at the beginning of the fall semester. The orientation includes discussions led by peer mentors and faculty members regarding challenges that P2s experience, fundamentals of PBL, and experiential learning expectations. Students participate in exercises that evaluate their learning preferences and are subsequently given tools to tailor their study practices to those preferences and to maximize time management skills. Finally, students meet with small groups and their peer mentor for team-building and PBL exercises.

The quality and dedication of peer mentors are integral to the success of the learning community. Third-year students can apply to be peer mentors if they have maintained a grade point average (GPA) of 3.5 and have a desire to guide students. After peer mentors are selected, they complete a day-long general training session designed by the university for peer mentors in all of the graduate and undergraduate programs. Then, they are oriented to the pharmacy program learning community and work with the faculty advisors and course coordinators to prepare for the learning community sessions throughout the academic year.

The learning community meets 4 times each semester. These sessions are planned at least one week prior to examinations to create an emphasis on study techniques and problem solving; they are not meant to focus on knowledge acquisition. Peer mentors work with course coordinators to design materials. Content focuses on case-based application, sample examination questions, and suggestions to enhance success in each course. Sessions are facilitated with the goal of creating an interactive environment instead of a teaching environment. Peer mentors as a group can be creative with activities, (eg, incorporating quiz show style games into selected sessions). Students are encouraged to work together to answer each other's questions and create community that values the collective learning and group success.

Peer mentors are available outside learning community sessions to provide individual tutoring and to schedule group review sessions prior to examinations. Tutoring needs may be identified by a faculty member or by students themselves and are tailored to fulfill students' individual needs. Review sessions before examinations are not structured, and students are encouraged to attend if they would like additional assistance. Participation in any of these activities, although voluntary, is strongly encouraged by faculty members.

The success of the program was assessed by comparing second-year students (P2) participating in the first 3 years of the learning community to the P2 students in the

3 academic years prior to the implementation of the learning community (pre-LC). To assess baseline academic performance of the groups, average GPA at admission and average overall Pharmacy College Admission Test (PCAT) scores were compared. Student academic success related to the learning community was assessed using the following measures of academic performance: number of students progressing to the third professional year, number of students successfully completing courses during the P2 year, distribution of grades, and on-time graduation.

Student perceptions of the learning community were measured through surveys after the last session in the fall and winter semesters (Appendix A) and at the end of the academic year (Appendix B). Students received an e-mail containing the survey within a week following a session. These postsession surveys assessed group dynamics, influence on studying, and impact of the peer mentor. The surveys were developed to address how well the learning community was meeting student needs. A combination of Likert scale and yes/no questions were used. The final question on the postsession survey was open-ended and asked what recommendations students had for the sessions. Two of the faculty advisors evaluated all written responses and identified themes using the conventional approach to content analysis as described by Hsieh and Shannon.[18] Themes were divided into "positive," "negative," and "recommendations" categories with clusters in each category. The end-of-year survey assessed student perception of the overall impact of the learning community on the P2 academic experience. Students rated their level of agreement using a 10-point Likert scale (with 10 being strongly agree) in response to 5 statements. Peer mentors also completed a survey at the end of the academic year (Appendix C). This survey assessed their experiences (adequate training, interactions with faculty members and students, and professional development) and sought suggestions for improvement. All surveys were anonymous and completed through E*Value (Advanced Informatics, Minneapolis, MN), which is used throughout the pharmacy program for student, programmatic, and course evaluation. Students also use it to maintain their student portfolio and complete assigned reflections.

Demographics (GPA's and PCAT scores) were compared using a student t test. Progression rates were compared using chi-square. The number of failing and passing grades for all students in the 9 courses was also compared using chi-square. The mean Likert score from the end-of-year surveys were compared using Kruskal-Wallis one-way analysis of variance, as the data was nonparametric and nonnormal. A post hoc analysis was performed on significant results using Mann-Whitney U test to compare all groups pairwise.[19] All statistics were completed using IBM SPSS for Windows, v22.0, (IBM Corp, Armonk, NY).

The WSU pharmacy program has been able to develop and sustain a learning community for P2 students through internal grants offered through the Office of the Vice President of Academic Affairs. Funds are used to pay peer mentors a stipend. Funding for the learning community has been granted since 2009, with the university's increasing expectations that the pharmacy program will help to support it. The protocol received approval from the Wayne State University Institutional Review Board.

EVALUATION AND ASSESSMENT

Three years of P2 students (246) and peer mentors (18) were included in the learning community group results. The pre-LC group included 273 P2 students. Upon entering the pharmacy program, average GPA and PCAT scores between the learning community (LC) and pre-LC groups did not differ (Table 1). Baseline data for the LC and pre-LC groups was only available as aggregate data at the beginning of the first professional pharmacy (P1) year and did not reflect changes in student composition between the P1 and P2 years. Most peer mentors were female (14 of 18), with average GPAs ranging from 3.54 to 3.72. An average of 13 students was assigned to each mentor. In the pre-LC group, 92.5% of P2 students progressed to the P3 year, increasing to 97% for the years after learning community implementation ($p=0.0115$). After implementation of the learning community, the number of students failing individual courses decreased (pre-LC 50/2,318 vs LC 15/2,151, $p< 0.001$). There was no change in the percentage of students receiving As, Bs, and Cs between the 2 groups ($p=0.17$).

The learning community appeared to have a significant positive impact on overall program progression. The percentage of students who graduated on time increased (pre-LC 83.8% vs LC 91.4%, $p=0.003$); this was a result of a decline in the number of students delayed for academic reasons from 11.3% to 3.8% ($p=.0004$). Less of a difference between the 2 groups was observed on exclusion from the pharmacy program (3.9% vs 1.5%, $p=0.062$).

For the 3 years of the learning community, 6 postsession surveys were evaluated (Table 2). The average survey response rate was 87.4% with 426 surveys completed. More than 90% of students believed that peer mentors enhanced the session. Session content did not always include teaching new study techniques, which was reflected in the varying responses to the corresponding survey question. Overall, students believed their

Table 1. Demographic Characteristics of P2 Students Before and After the Implementation of the Learning Community

	Pre Year 1	Pre Year 2	Pre Year 3	Pre Average	Post Year 1	Post Year 2	Post Year 3	Post Average	*p*
Number	87	81	95	88 (7)	83	81	72	79 (5)	
PCAT (SD)	81 (12)	74 (17)	73 (10)	76.1 (3.7)	81 (11)	76 (13)	77 (12)	78 (2.7)	0.98
Prerequisite GPA (SD)	3.62 (0.27)**	3.64 (0.24)	3.65 (0.22)	3.64 (0.01)	3.63 (0.29)	3.58 (0.28)	3.58 (0.25)	3.60 (0.03)	0.10

PCAT=Pharmacy College Admission Test; GPA=grade point average; Pre Year 1-3=3 years prior to implementation of the learning community; Post Year 1-3=3 years following implementation of the learning community
**Only cumulative GPA available for first control year

groups worked well together and this seemed to improve over time, reaching over 90% agreement in year 3.

The postsession survey included an open-ended question asking for recommendations for future sessions (Table 3). Positive comments were predominant and themes included activities being helpful, peer mentors being good leaders, and the session being helpful. The most common negative theme was that the session was not useful. The most common recommendation was to change the time of the session to earlier in the day.

The response rate for the end-of-year survey was 80% (13). Figure 1 depicts students' perceptions of the learning community at the end of each year. There was a significant difference between mean results on the survey questions over the 3 years ($p<0.002$). A post hoc analysis showed that year 3 of the program had significantly more positive responses than year 1 and year 2 ($p< 0.008$ for both comparisons).

The response rate for the end-of-year survey for the peer mentors was 17/18. Fifteen indicated that the experience was "great" or "exceptional," 2 responded it was "good," and there were no responses for "OK" or "poor."

Sixteen peer mentors expressed they would still consider being one even if no stipend were offered. All responded they felt supported by the learning community faculty members. Fourteen mentors said working with the individual course coordinators was easy while 3 said it was challenging. The qualitative portion of the end-of-year peer mentor survey provided some common themes. Mentors stated that unmotivated students, lack of participation, poor student attitudes, and personal time management were the most challenging aspects of the position. If they could change anything about the learning community, mentors responded they would decrease group size, increase student participation, and adjust the timing and length of the sessions in response to student complaints. Overwhelmingly, the peer mentors expressed the most rewarding aspect of the experience was interacting with the students and seeing students benefit from sessions and tutoring. Benefits they perceived included increasing confidence in teaching and knowledge base, becoming a more efficient learner, and increasing desire to pursue an academic career. The following comments are representative of mentor responses: "I found that tailoring one's

Table 2. Learning Community Participant Responses to Postsession Surveys

	Fall Semester	Winter Semester
Year 1, n	80	77
Group worked together (% well or very well)	77	79
Session influenced studying (% yes)	61	43
Learn new study techniques (% yes)	41	22
Peer mentor enhance session (% yes)	98	92
Year 2, n	61	73
Group worked together (% well or very well)	84	81
Session influenced studying (% yes)	66	47
Learn new study techniques (% yes)	51	33
Peer mentor enhance session (% yes)	95	90
Year 3, n	71	64
Group worked together (% well or very well)	96	92
Session influenced studying (% yes)	75	78
Learn new study techniques (% yes)	62	64
Peer mentor enhance session (% yes)	93	95

Table 3. Qualitative Themes from Postsession Surveys

Theme (No.)	Representative Comments
Positive	
Peer mentor was good leader (33)	Our leader did a great job.
	My mentor was excellent, always gave great advice.
	I like that we as a group decided what to focus on and our mentor helped us with that.
	She taught some great study tips, also was very approachable and encouraging.
	Our peer mentor was great, she really helped focus our studying.
Activities were helpful (49)	Practicing real lab situations and working on problem sets was very helpful.
	Very well organized, the group had plenty of material to go through and it was helpful. I enjoyed the numerous assignments we set out to accomplish.
	Sessions where we get to go over actual patient cases and exam questions are very beneficial.
Enjoyed sessions/sessions beneficial (30)	I enjoyed it.
	This session went great. There was an agenda and topics to review which helped the sessions be very successful.
	I have learned different tricks and methods to study that I didn't know before.
Group work beneficial (4)	It is good to be able to work in a group on questions that can be difficult.
Negative	
Not beneficial for my study habits (4)	I prefer to study by myself.
Session was not useful (12)	The first session was not useful.
	Haven't gotten much out of learning community at all this year.
Peer mentor not efficient facilitator (7)	Sometimes my peer mentor does not seem to be prepared for the session.
	Encourage everyone in the group to participate.
Recommendations	
Change time to be more convenient/ closer to examinations (25)	I do not think it is necessary to have sessions scheduled.
	The only thing I would recommend is to have the sessions earlier in the day or before classes.
	Coordinate sessions with exams.
Shorter sessions/ not mandatory (15)	Do not make this a required event.
More sessions would be beneficial (7)	Addition of more sessions during the semester may be beneficial to students.
Sessions should be more student driven (6)	Allow students to come to consensus before giving the correct answer.
Include more sample cases, examination questions, & topics (11)	

approach to each student was a challenge as well as a rewarding experience;" "Some of the challenges include balancing knowing the material and the answers but not just telling them. It was hard to ask the right questions to get the students to discover the answers themselves;" "Being a peer mentor helped me understand the perspective of the professor and helped me to look at things in different ways. It helped in expanding my leadership skills and my communication skills."

DISCUSSION

Implementation of a learning community for second-year students was successful over the first 3 years and benefited students, peer mentors, and the program. The learning community improved student progression and decreased failure rates. Student comments were consistently positive regarding help provided by peer mentors. Some students expressed concern over the timing of the program and mandatory attendance policy. Peer mentors reported that the experience provided multiple benefits, including enhancing their own knowledge base and improving their communication skills. Faculty advisors and course coordinators provided continuity and support to mentors, according to peer mentor responses, which also noted that faculty members impacted their professional development and added to the success of the program. The most common challenge identified by mentors was negative student attitudes. Student perceptions of the learning community, however, significantly improved over the 3 years of the program. Evaluating student perceptions after only the first year would not have shown the value
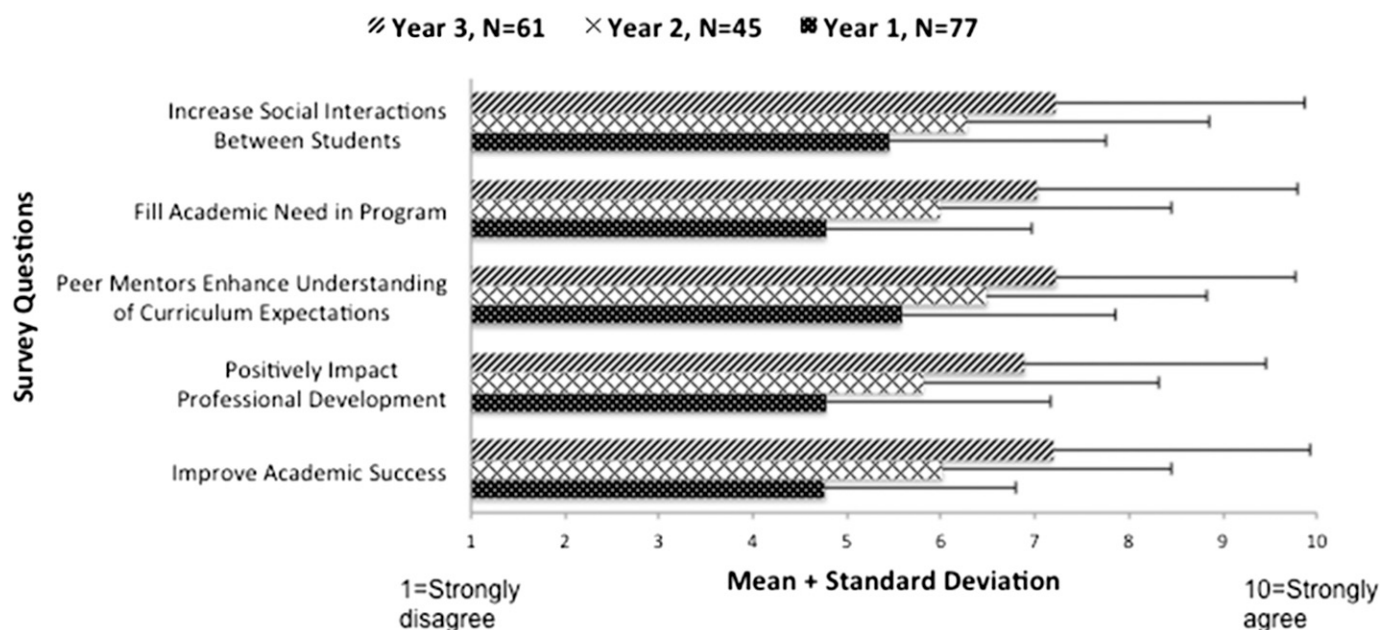
Figure 1. End of Year Student Perception of Learning Communities

of persisting and creating a culture of community within the pharmacy program.

A review of learning communities in higher education demonstrates a lack of uniformity in design and desired outcomes, which include team development, student success, critical thinking, student engagement, clinical skills development, and professional and personal development.[20] Some learning communities are unstructured, while others have specific roles and responsibilities assigned to students, faculty members, and peer mentors.[20] Uniformly, goals are defined for the learning community, and the structure is designed to meet those goals. For example, a 4-year longitudinal learning community in a medical school incorporated faculty members, student leaders, and an instructional component; its goal was to promote wellness and provide career advising, and I resulted in increased student satisfaction.[12] A less structured medical school learning community, composed of students and faculty members, stated a goal of fostering camaraderie, networking, and professionalism. They described increased engagement in curricular innovation as a positive outcome.[11] While the majority of learning communities encompass multiple courses, one learning community was formed within medicinal chemistry courses and included faculty members from different disciplines providing integration with an individual course.[17] Our learning community was specifically focused on enhancing student success during an entire year of the curriculum and utilized a structured approach of sessions designed and facilitated by peer mentors. The common link of this

report and others is the definition of specific goals and the design of a program to meet those goals. Outcomes of any learning community should be assessed to support continued resource allocation.

The goal of our learning community was to enhance student success, and it highlighted several considerations when working to enhance success in other areas of higher education. First, student peers are an invaluable resource. A systematic review of the available data in health sciences literature supported use of peer tutoring, illustrated that format is highly dependent on the particular context, did not yield results different from those of faculty tutoring, and was superior to no tutoring.[21] Second, our learning community created a community of learners. This was indirectly measured through student responses that their groups worked well together; we expect this may be extrapolated to increased collaboration and improved relationships within the entire class. Third, the improved perceptions of the learning community found in the end-of-year surveys demonstrate that persevering through the initial phases of any new element in a program is essential to see the full benefit. It is natural to resist change, and students are sensitive to increasing demands on their time. From the students' perspectives, the learning community became an expected component of the pharmacy program by the third year, leading to less student resistance. Additionally, peer mentors in the second and third years may have become more comfortable with their roles and responsibilities as they had observed peer mentors when they were P2s.

As we moved through the initial years of the program, surveys and student feedback were used for continuous quality improvement. The content of the sessions changed significantly over time with the use of case discussions, emphasis on cognitive processes, and discussion of effective study techniques. The peer mentors shared survey results with their learning community groups and designed consistent messages about the intent and the benefits of the learning community. These elements may have also been influential in the improvement of student perceptions over time.

As colleges and schools of pharmacy design programs to enhance academic success, they must consider its predictors, such as PCAT scores, GPA, prerequisite chemistry and biology grades, and ACT scores.[22-25] These predictors are related to admission criteria and are not modifiable. Potentially modifiable predictors such as test competence, test anxiety, time management, and self-efficacy-demonstrate relationships with academic success or failure.[23,24] Targeting these modifiable predictors offers the potential for the greatest impact on success with the implementation of a learning community. Further investigation into the impact of targeting these specific predictors may explain the reason for the benefit seen in this report.

In terms of limitations, the pre/post quasi-experimental model was not able to account for unrecognized variation between classes, course coordinator changes, and changes in extracurricular activities. The classes compared had similar GPAs and PCAT scores on admission. Two of the courses changed course coordinators, although the courses were all team taught, and the majority of lecturers stayed the same. Some course policies may have changed and were not captured in our analysis. All surveys were designed at the beginning of the study, and no validated surveys were available. The surveys were tested on a small group of subjects, and the same surveys were used consistently throughout the 3 years. The training, knowledge base, and skills of the peer mentors was important to the success of the learning community, and no significant deficiencies were identified in any of the mentors during this 3-year period. However, variability among peer mentors could have affected results.

Programs considering the initiation of a learning community should start the process by identifying the needs within their program and the goals of the learning community. Subsequently, the appropriate structure, duration, and roles of faculty members, mentors, and students need to be defined. The design must include the 4 key characteristics outlined in the introduction.[7] Community structures vary, differing by time (semester, year, program) and complexity (integration in course work,

definition of activities, and roles of participants). Resource requirements, including faculty member and student time, as well as space and financial implications, must be considered when making decisions about structure. In our learning community, we were able to obtain resources to hire peer mentors and solidify their commitment for an entire year. The commitment in a learning community added to the expectations of faculty responsibilities. The space requirements could be satisfied within our current physical facilities. The complexity of the program structure will define resources and level of coordination required. Finally, the goal of the program should drive the structure and the assessments.

The P2 learning community continues and is fully supported through the pharmacy program and the dean of students at WSU. The program continues to be assessed through surveys and objective data. As our curriculum changes and is enhanced, curricular assessments will identify areas of difficulty for students, and the learning community will evolve to serve program needs.

SUMMARY

A learning community can result in enhanced academic success in second-year pharmacy students. Students may resist a mandatory learning community program as they may perceive it as an additional, unnecessary expectation. Emphasizing the importance of community success and sharing available outcome data may lead to increased acceptance of the program over time. Students who act as peer mentors report significant benefits in their own professional development. Pharmacy programs can benefit from incorporating peer mentoring and formal or informal learning communities to enhance student success.

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Appendix A

Learning Community Session Evaluation
  1. How well did your group work together?
   (1= not well…5= very well)
  2. Did this session influence how you will study for upcoming examinations?
   (yes, no)
  3. Did you learn any new study techniques in this session?
   (yes, no)
  4. Did the peer mentor enhance the value of the session?
   (yes, no)
  5. Do you have any recommendations for improving future sessions?

Appendix B

Student Perception of Learning Communities, End of P2 year
  (Likert Scale: 1= strongly disagree…10= strongly agree)
  1. Learning communities are beneficial in improving academic success of students in the program.
  2. Learning communities have a positive impact on professional development of students in the pharmacy program.
  3. Building relationships with third-year students through learning communities enhanced my understanding of the expectations of the pharmacy curriculum.
  4. Learning communities fulfilled an academic need in the pharmacy program.
  5. Learning communities allowed students to increase their social interaction with one another.

Appendix C

Peer Mentor Perception of Learning Communities
1. How would you rate your overall experience as a peer mentor?
  (poor, OK, good, great, exceptional)
2. Did you feel supported by the learning community faculty members?
  (yes, no)
3. Do you feel you received sufficient information about the program and how it operates?
  (yes, no)
4. If not, what information would you find helpful?
5. What were some challenges of meeting students during the learning community sessions?
6. If you could change one thing about the learning community sessions, what would it be?
7. Working with the course coordinators was:
  (easy, challenging, difficult)
8. If you could change one thing about working with the course coordinators, what would it be?
9. Do you feel that you were adequately trained and oriented regarding expectations of the learning community?
10. What did you find most enjoyable?
11. What did you find most challenging?
12. What changes or suggestions do you have?
13. If a stipend was not offered, would you still consider a peer mentor position?
  (yes, no)
14. How did serving as a peer mentor impact your experience as a pharmacy student?