INSTRUCTIONAL DESIGN AND ASSESSMENT

A Health Policy Course Based on Fink's Taxonomy of Significant Learning

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Objective. To incorporate Fink's Taxonomy of Significant Learning into a course and determine whether doing so increased students' knowledge of and interest in healthcare policy.

Design. A healthcare policy course for second-year doctor of pharmacy (PharmD) students was redesigned to incorporate activities reflecting Fink's Taxonomy including completing a required reading, outlining the required reading, presenting the outline to a small group of peers, attending lectures, and completing a final policy project and simulation activity.

Assessment. The effectiveness of the course was assessed using a pre-post non-randomized control design, with nursing and social work students serving as the control group. Interest and knowledge scores increased significantly among students in the intervention group. Differences between the low-interest students and the rest of the class identified on the precourse tests were not apparent on the postcourse test.

Implications. Applying Fink's Taxonomy to course activities increased students' interest in and importance placed on learning health policy.

Keywords: health policy, Fink's Taxonomy of Significant Learning, active learning

INTRODUCTION

During a pharmacy law course, the first author (K.K.) observed students using higher-order learning skills to help them memorize the law. This observation did not seem consistent with Bloom's cognitive taxonomy. A colleague later recommended a book entitled *Creating Significant Learning Experiences* to explain the observations.¹ The book challenges readers to reconsider how time is used in the classroom. The principles learned led to the author's redesign of a health policy course using the Taxonomy of Significant Learning. A description of the redesign and subsequent assessment are described here.

Learning is the act, process, or experience of gaining knowledge or skills. For learning to occur there must be some change in the learner; for significant learning to occur, there should be lasting change that is important to the learner.¹ To help teachers facilitate this type of change in learners, Fink's Taxonomy of Significant Learning delineates significant kinds of learning (Table

1).¹ Unlike other approaches, such as Bloom's cognitive taxonomy, the components in Fink's Taxonomy are relational to and interactive with one another rather than hierarchical. Fink's Taxonomy has been used to engage students in a pharmacokinetics course,² but has not been used in a health policy course.

Interest in a topic is a requisite for engaging students and creating change that is important to the learner. Hidi and Renninger proposed the Four-Phase Model of Interest as a tool that educators can use to identify and develop students' interest in the course topic.³ The 4 phases are: (1) Triggered Situational Interest (interest is stimulated from short-term changes in cognitive and affective processing triggered from external sources); (2) Maintained Situational Interest (focused attention persists over a period of time); (3) Emerging Individual Interest (beginning personal interest that will cause students to re-engage in the material over time); and (3) Well-Developed Individual Interest (strong personal interest and desire to engage in the material repeatedly over time).³ Progress through the 4 phases of the model is sequential, with the first 2 phases being stimulated by external forces. Fink's Taxonomy of Significant Learning could be used as a framework to stimulate interest in a subject to the extent that it becomes internalized and sustained.

To create interest and help pharmacy students engage in the policy process, a health policy course at the

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Table 1. Components of the Taxonomy of Significant Learning

Component	Description / Interpretation
Foundational Knowledge	Understanding and remembering information and ideas is necessary for other kinds of learning.
Application	Developing skills (such as project management); engaging in critical, creative, and/or practical thinking allows other kinds of learning to take place.
Integration	Connecting concepts, ideas, people, and experiences gives learners new intellectual power.
Human Dimension	Learning about self and others. This teaches students about the human significance of what they are learning.
Caring	Developing new feelings, interests, and values about something related to what they students are learning. This helps energize and engage students.
Learning How to Learn	Becoming a better, self-directed learner and a better inquirer about a subject. This enables students to continue learning after they finish the course.

University of Wyoming School of Pharmacy was redesigned to incorporate activities that touched on the components of Fink's Taxonomy. The previous course design had covered the same topics as the new course but used a different format. Also, the majority of course content had been provided by guest lecturers (former state health officials or healthcare policy researchers) and students found this distracting because their lecture styles and depth of coverage of the material varied greatly.

The objectives of this study were to determine (1) whether a health policy course redesigned to incorporate Fink's Taxonomy of Significant Learning increased students' knowledge of health policy and the healthcare system, interest in health policy and the healthcare system, and perceived importance of learning about health policy and the healthcare system; and (2) students' willingness to participate in the policy process after participating in the course; (3) which classroom activities addressed the various components of the Taxonomy of Significant Learning; and (4) whether there is a difference between students who have low versus higher interest in health policy at the beginning of the class.

DESIGN

The required health policy course was offered in the spring semester of the second year. During the previous summer, students had completed two 4-week introductory practice experiences (IPPEs) (1 community pharmacy and 1 hospital pharmacy IPPE), which ensured they all had some exposure to the healthcare system.

The policy course had a typical enrollment of between 48 and 52 students and met 3 times per week. Activities included completing a pre-class required reading,

outlining the required reading, presenting the outline to a small group of peers, attending lectures, and completing a final policy project and a simulation activity.

Required Readings

Required readings and an outlining activity were designed to develop foundational knowledge. Students self-selected into groups of 3-4 students and each student was assigned a reading from 1 of 3 required textbooks. Students had to submit an outline of their assigned reading material prior to class on Monday. During that class period, the students in the group participated in peer-to-peer teaching by presenting the information from their assigned reading to the other group members. Peer-to-peer teaching in small groups was incorporated to build upon foundational knowledge and promote integration and inquiry skills. At the end of the class period, the group had to submit a worksheet on which they compared and contrasted the week's readings, highlighted the most important points, and asked for clarification about confusing points. A worksheet template was provided to the students for consistency and ease of grading.

Lectures

Lectures over the week's material were presented by the instructor on Wednesdays and Fridays, but attendance was not required. The lecture was a combination of instructor presentation and facilitated discussion. This activity was designed to enhance foundational knowledge and integration. Guest lecturers from the governor's health policy advisor and the chair of either the state senate or state house of representatives committee on health, welfare, and labor were presented during the first 2 weeks

of class to orient students to issues that would likely impact the state over the next 5-10 years.

Simulation Activity

During the first week of class, students were randomly assigned to a state government, insurance company, pharmaceutical manufacturer, healthcare provider group, the Food and Drug Administration (FDA), or the judicial committee. Students were given (1) a description of their assigned agency and a list of the parties with which that agency normally would need to negotiate; (2) a policy and procedures template to be completed and submitted before the simulation started; and (3) a group-specific Excel spreadsheet that contained financial and human resources and embedded equations to track their operating expenses/profits. The spreadsheet was used to help the groups strategize prior to the simulation, assist with negotiations during the simulation, and determine the final winners in each category at the end of the simulation.

During the last 6 class sessions, students negotiated with other groups to buy or sell services to provide healthcare to the citizens of the 3 states. Using outcome variables contained in the spreadsheets, a winner was selected from each business category (ie, pharmaceutical manufacturer, insurance company, provider organization, and state government). The outcome variables differed by business category and included items such as total profit, number of lives covered, proportion of budget used, etc.

Final Project

The final course requirement was completion of a longitudinal policy project designed to promote application, learning, and integration. Each group of students had to identify an issue facing the state in the next 5-10 years and then develop a new policy to address the problem. In a formal paper, the group had to describe the problem, describe a new or modified policy for addressing the problem, identify the stakeholders and how the new policy impacted each of them, explain how the policy would be financed, describe the ethical implications of the new policy, and provide references.

Four computer-based examinations consisting primarily of essay questions were administered during the course. This study was approved by the university's institutional review board and conducted between January 2009 and May 2009.

EVALUATION AND ASSESSMENT

A pre-post nonrandomized control study design was used to evaluate changes in students' knowledge, interest in health policy, and perceived importance of health policy compared to a control group. The differences between

students with low interest in health policy and other students also was examined. The students enrolled in the health policy course served as the intervention group. Junior-level nursing and social work students not enrolled in the health policy course but who were at a comparable point in their academic career served as a control group. The nursing students were selected because they had similar preprofessional training (including the university core curriculum requirements) and similar exposure to the healthcare system through early clinical experiences, and had been enrolled in college for at least 3 years. The social work students had been enrolled in college for at least 3 years and had taken the same university core curriculum courses. All participants provided informed consent.

The primary outcomes of this study were changes in the scores on the test of knowledge of health policy/healthcare system concepts, health policy interest scale, and health policy importance scale (these scales can be obtained from the first author). The test of knowledge consisted of 12 multiple-choice items and was created to assess knowledge of topics covered in class such as the uninsured; health savings and health reimbursement accounts; competition in the insurance industry; factors influencing the demand for healthcare; Medicare/Medicaid; fee for services vs. capitation reimbursement schemes; and the differences between various health management organizations (HMO) models, traditional indemnity insurance organizations, and preferred provider organizations. This instrument was developed from examinations given in previous iterations of the class when a single textbook and a different teaching format were used.

The adapted health policy interest scale and health policy importance scales each consisted of 8 questions and used a 10-point Likert-like scale. The range of possible scores was from 8 to 80. The 8-item health policy interest scale was adapted from an instrument originally created to assess interest in middle school social studies before and after a 5 week Web-based simulation activity.⁴ The original instrument was based on Hidi and Renninger's theory and tapped interest stimulated by the simulation as well as interest which extended beyond the simulation.³ The internal consistency was acceptable (Cronbach's alpha = 0.85 for pre and 0.87 for post), so students with higher scores should have more interest in social studies.⁴ The health policy importance scale was different from the one used by Gehlbach and colleagues since their scale was not adaptable to this situation, and it mirrored the health policy interest scale since it is possible that students might believe certain topics are important but they have little interest in them or vice versa.⁴

The content and face validity of the adapted health policy interest and health policy importance scales was

assessed by 2 fourth-year pharmacy students participating in academic advanced pharmacy practice experiences and 2 faculty members. The internal consistency reliability was assessed using Cronbach's α . Students in both the control and intervention groups who scored less than 36 on the health policy interest scale at the beginning of the semester were categorized as "low-interest" students for the purposes of the evaluation.

Two additional outcomes that were assessed only in the intervention group included students' willingness to participate in the policy process after participating in the course and how/whether the classroom activities addressed the various components of the Taxonomy of Significant Learning. Students were asked to select those class activities that engaged them; stimulated their critical, creative, or practical thinking; helped them become better learners; enhanced their understanding of the human significance of the course material; helped them integrate different concepts and ideas; and helped build their knowledge of the health policy process and the US healthcare system. For each of these 8 items, the students were asked to select all that applied from the given list: pre-class readings, outlining, lecture by professor, peer teaching in small groups, examinations, the final project, the simulation activity, or none of the activities.

The evaluation instruments were administered to students enrolled in the course and to the control group during the first week of class and again during the last week of class. Fifty-two of the 57 students enrolled in the course completed both the precourse and postcourse tests and 22 (56%) of the 39 students in the control group completed both the precourse and postcourse tests.

Cronbach's alpha was used to assess the internal consistency reliability of the health policy interest and importance scales. Differences between groups and changes in precourse and postcourse scores on the Health Policy Interest and Importance scales and the knowledge test were analyzed with repeated measures ANOVA. Frequency distributions (as percentages) were used to describe the willingness to participate in the policy process after taking the course and the class activities that addressed the components of Fink's Taxonomy. Alpha less than 0.05 was used to determine statistical significance.

Findings

Using Cronbach's alpha to measure the internal consistency for the precourse and postcourse administrations of the health policy interest and importance scales resulted in satisfactory reliability for both instruments. The alpha for the health policy interest scale ranged from 0.89 to 0.98 and 0.73 to 0.95 for the health policy importance scale (Table 2).

Table 2. Internal Consistency of the Health Policy Scales

Group	Health Policy Interest Scale (Cronbach's alpha)	Health Policy Importance Scale (Cronbach's alpha)
Intervention (n = 52)		
Precourse	0.93	0.95
Postcourse	0.94	0.95
Control (n = 22)		
Precourse	0.89	0.73
Postcourse	0.98	0.93

Interest in Health Policy. There was no significant difference between the intervention and control groups on the precourse health policy interest scale scores; however, the intervention group had significantly higher scores on the postcourse measure. There also were significant changes in the interest scale scores for students in the intervention group but not the control group (Table 3). Students in both groups with interest scores less than 36 at the beginning of the semester ("low-interest students") had significantly lower interest scale scores on the precourse survey compared to their classmates, but this difference disappeared in the postcourse measure (Table 3). The low-interest students in the intervention group had much larger increases in postcourse interest scale scores than any other group.

Perceived Importance of Health Policy. There was no significant difference between the groups on pre-course health policy importance scale scores; however, the intervention group had significantly higher postcourse scores compared to the control group (Table 3). The low-interest students in both the intervention and control groups had significantly lower precourse scores compared to other students. There was no difference in the postcourse importance scale scores between students with low interest scores at the beginning of class and their classmates.

Knowledge of Health Policy and the Healthcare System. The control group had significantly lower knowledge scores than the intervention group in both the precourse and postcourse measures (Table 3). A significant increases in knowledge scores occurred in the intervention but not the control group (Table 3). Using repeated measures ANOVA, no difference in overall change in knowledge scores was found between the groups; however, the change in knowledge score was influenced by the group. There was no difference in knowledge scores between low-interest students and the rest of their classmates in either the precourse or postcourse measure.

Future Participation in the Policy Process. Of the 57 students enrolled in the course, the majority were more likely to get involved in the health policy process at the

Table 3. Health Policy Interest, Important, and Knowledge Scores of Pharmacy Students Enrolled in a Public Health Policy Course and Students in a Control Group

Group	n	Health Policy Interest Scale, Mean (SD)	Health Policy Importance Scale, Mean (SD)	Health Policy Knowledge, Mean (SD)
Intervention group				
Precourse				
All	52	53.6 (13.7) ^a	64.1 (11.1)	62.6 (16.8) ^{ab}
Low-interest group	5	24.0 (6.8)	45.4 (15.8)	68.3 (19.9)
Rest of class	47	56.8 (9.9)	66.0 (8.5)	62.1 (16.6)
Postcourse				
All	52	59.0 (12.2) ^c	66.3 (10.65) ^c	74.8 (13.0) ^c
Low-interest group	5	64.6 (4.7)	69.2 (6.1)	75.0 (16.7)
Rest of class	47	58.4 (12.6)	65.9 (11.0)	74.8 (12.8)
Control group				
Precourse				
All	22	51.0 (12.0)	63.0 (6.1)	46.2 (18.8)
Low-interest group	3	31.3 (3.1)	61.0 (4.3)	52.7 (9.6)
Rest of class	19	54.2 (9.7)	63.4 (6.4)	45.2 (19.9)
Postcourse				
All	22	50.7 (18.9)	59.6 (11.24)	45.8 (16.2)
Low-interest group	3	32.7 (28.7)	54.7 (9.0)	50.0 (33.3)
Rest of Class	19	53.6 (16.3)	60.4 (11.6)	45.2 (13.4)

Definition of terms: all = results for all students in the group; low interest group = results for students in the group who scored less than 36 on the pre-course health policy interest scale; rest of class = results for students in the group who scored 36 or above on the pre-course health policy interest scale.

^a Significant difference between the pre and post score for the intervention group.

^b Significant difference between the intervention and control group pre scores.

^c Significant difference between the intervention and control group post scores.

employer, local, and/or state level (86%, 75%, and 55%, respectively). Twenty-two percent (22%) of the students reported that they were less likely to get involved in the health policy process at the federal level and 12% were less likely to get involved at the state level after taking this class.

Course Activities and the Taxonomy of Significant Learning. When asked about the activities that engaged them, the students most frequently reported lectures (86%), the simulation activity (80%), and the readings (77% of students). A higher proportion of students with low-interest in health policy at the beginning of the semester reported that the readings and peer teaching engaged them (100% vs. 75% for readings and 80% vs. 65% for peer teaching), but a smaller proportion found the simulation activity engaging (60% vs. 82%) (Table 4).

Students reported that the readings, lectures, and preparing for and taking the essay examinations helped them become better learners. Compared to the rest of the class, a greater proportion of the low-interest students reported that the readings (100% vs. 84%), outlining (100% vs. 67%), peer teaching (80% vs. 61%), and lectures (100% vs. 80%) helped them become better learners (Table 4).

When asked which activities helped them appreciate the human significance of what they were learning, the simulation activity was reported most frequently. There was little difference between students with low interest and the rest of the class (80% vs. 75%).

To assess the “application” domain of the taxonomy, students were asked 3 different questions about the activities that stimulated their critical, creative, and practical-thinking skills. The simulation activity and the final policy project were reported most frequently to engage critical thinking skills (82% and 63% for the simulation and final project, respectively), creative-thinking skills (89% and 73%, respectively), and practical-thinking skills (75% and 61%, respectively). There were marked differences between the low interest group and the rest of the class with the low interest group more frequently citing the readings, outlining, peer to peer teaching, and lectures as engaging critical, creative, and practical thinking skills (Table 4).

The simulation activity, lectures, and final project were cited most frequently (77%, 70%, and 55% of class, respectively) as the activities that helped students connect

Table 4. Assessment of the Components of the Taxonomy of Significant Learning by Low-Interest Level (n=5) and Regular-Interest Level (n = 47) Pharmacy Students, %

Activities That:	Level of Interest	Pre-class readings	Outlining Chapters	Peer Teaching	Lectures	Examinations	Simulation Activity	Final Project	None
Engaged me	Low	100	60	80	80	40	60	60	0
	Regular	75	67	65	86	41	82	53	0
Helped me become a better inquirer/learner	Low	100	100	80	100	20	60	40	0
	Regular	84	67	61	80	28	67	47	0
Helped me appreciate the human significance of the material	Low	60	40	60	60	20	80	40	0
	Regular	65	43	63	71	18	75	37	2
Engaged my critical thinking skills	Low	80	80	80	100	60	80	60	0
	Regular	37	41	55	37	46	82	63	2
Engaged my creative thinking skills	Low	100	60	80	80	50	80	60	0
	Regular	22	25	29	12	22	90	75	4
Engaged my practical thinking skills	Low	80	80	80	80	50	80	40	0
	Regular	41	47	55	49	41	75	63	0
Helped me connect ideas and experiences	Low	40	40	60	60	20	80	60	0
	Regular	51	35	57	71	25	76	55	0
Helped me learn about the US healthcare system	Low	100	80	80	100	50	80	60	0
	Regular	96	69	73	96	45	69	57	0
Helped me learn about the health policy process	Low	100	80	100	100	60	80	20	0
	Regular	92	59	67	94	37	76	55	2

different ideas and experiences to better understand and apply the material. To grossly assess foundational knowledge, students were asked which activities helped them learn about the health policy process and the US healthcare system and responded: readings (93% and 96%, for learning about the policy process and healthcare system respectively), lectures (95%/96%), the simulation activity (77%/70%), and peer-to-peer teaching (70%/73%).

DISCUSSION

This study design tested the impact of the class as a whole rather than the application of Fink's Taxonomy because the comparison group was not enrolled in the health policy course. The redesigned course was able to stimulate interest in the low-interest group and engage them in the material. Giving up lecture time to incorporate targeted active-learning activities engaged students and made the remaining lecture time more productive and efficient because it could be used to connect ideas/concepts and clarify pre-identified points of confusion.

The combination of pre-class, in-class, and longitudinal activities covered most of the components of Fink's Taxonomy. The readings, lectures, peer-to-peer teaching, and simulation activity helped students build foundational knowledge. The readings, lecture, and the examination process helped students become better learners.

The simulation activity and the final project helped students apply the material. The simulation activity, final policy project, and lectures helped the students connect ideas and experiences to better understand and apply the material. The simulation activity also helped students understand how the things they were learning in class impacted members of society.

The caring dimension of the taxonomy deals with helping students develop new feelings, interests, or values about what they are learning. This is what energized and engaged the students. Although the readings, lectures, and simulation activity were most frequently cited as engaging the students, the caring dimension was not directly assessed at the end of the class. The instructor had to assess this on a continual basis during the semester using attendance, class participation, and blank stares as assessment tools. When students seemed confused or disengaged, the instructor tried to help the students make a personal connection to the material by engaging them in a dialog to better understand the disconnect or by inserting "so what" segments into the lectures. During a "so what" segment, the instructor stopped the lecture and called upon the students to state the relevance of the topic under discussion or summarize its relationship to other topics or current events.

When asked about the activities that engaged their critical, creative, and practical thinking, students with

low interest in health policy at the beginning of the semester cited the readings, outlining, peer teaching, and lectures much more frequently than did the rest of the class. This could be a function of time on task, that is, the students with low interest actually completed the readings and activities and found them beneficial. By reading and outlining the required readings, they were able to get more out of the peer-to-peer teaching and lectures. Compared to the rest of the class, a smaller proportion of students in the low-interest group cited the final policy project contributing to their learning. Since this was a group project, it would be interesting to know whether this was a function of low participation or the fact that the readings, outlining, and peer teaching had a much greater relative contribution to the development of their foundational knowledge.

Interestingly, the more removed students are from the health policy process the less likely they are to get involved. Students are more likely to get involved in the health policy process at the local and state level than the federal level. Little time, if any, in the course was spent discussing how citizens can get involved in the process at the federal level. Involving pharmacy organizations to discuss advocacy at a national level may address this disconnect among pharmacy students.

CONCLUSIONS

A redesigned health care policy course increased students' knowledge of and interest in the policy process and in the healthcare system. Incorporating activities that use the components of the Taxonomy of Significant Learning stimulated interest and engaged low-interest students in the subject matter. Engaging students in the health policy process is critical given the current focus on healthcare reform and the fact that pharmacy is a highly regulated profession. Both patients and the profession could benefit from students and pharmacists continuously reminding policy makers about pharmacists' capabilities and contribution to patient care.

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