Interprofessional Education Evaluation; student satisfaction with an error disclosure event

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Abstract

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Interprofessional education (IPE) is a growing topic in health science education. There are a number of IPE research concerns including; ideal instructional topics, faculty development, and logistic concerns. In order to explore these concerns in a practical manner, 4 years, 2011-2014, university based IPE event centering on healthcare error disclosure has been evaluated. The event consists of 2 components, lecture and team practice, was attended by medical, nursing, pharmacy, dentistry, and physician assistant students and was evaluated with an event specific measurement tool with a satisfaction survey and open-ended questions. Descriptive and regression results highlight that this error disclosure educational event is satisfactory to students and maybe a robust topic due to its ability to satisfy across professions and small group assignment. Directed content analysis was used to evaluate the qualitative data. This analysis suggested that not only did the topic of error disclosure satisfy students it also might work as a vector to teach IPE skills. In conclusion, as IPE needs grow more educational events need to be created and evaluated. This university based error disclosure program presents one event that shows promise as a valuable IPE tool.

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Background

Interprofessional education in the health sciences

Interprofessional education (IPE) is a construct used in the health sciences to mean the mutual educating and learning of students or practitioners from a variety of professions or disciplines with the ultimate goals of increasing teamwork, understanding, and respect for others (Olenick, Allen, & Smego, 2010). A common definition used in the literature is that IPE occurs "when members of two or more professions learn with, from, and about one another to improve collaboration and patient care"(WHO, 2010). As the definitions allude to, IPE can look like a lot of things as long as there are two or more professions represented and there is a conscience effort to learn together and from each other. Examples of IPE include, lecture-based seminars, team rounding on patients (Fletcher, Furney, & Stern, 2007), and scenario-based stimulation.

IPE is a growing topic in the current field of healthcare education. Numerous public reports (Mitchell et al., 2012), research studies(Headrick et al., 1996; James, 2002; Litaker et al., 2003; Wade et al., 2003), and influential reports (Panel, 2011) have stimulated an interest in students, educators, researchers, and healthcare administrators (Schofield & Ameodeo, 1990). IPE and similar interprofessional collaboration interventions are starting to demonstrate a variety of positive patient health outcomes such as decreased length of hospitalization, improved provider communication, and appropriate timing of medication prescribing (Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013; Zwarenetien, Goldman, & Reeves, 2009).

Note that the overall link between IPE and patient health outcomes remains weak due to a small number of high quality research studies and limitations of causation (Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013).

Due to the complexity of measuring the intersection between educational interventions and clincial outcomes as well as the current knowledge of the field, the majority of the current IPE research focuses on student's learning outcomes. A descriptive systematic review of IPE student learning outcomes, conducted by Hammick, Freeth, Koppel, Reeves, and Barr (2007), demostrated that a variety of student learning outcomes are commonly measured. For their review, they ulitized and modified Kirkpatrick's four-level model of educational outcomes (see figure 1) revealing that 67% (14 of the 21 reviewed articles) reported data that reflected learner's reaction. Learner's reaction is defined as the student's opinion and attitude about the educational event and Kirkpatrick theorized that without a positive attitude it is unlikely that students will learn (Thackwray, 1997, pp. 17-28). Thus measuring student's attitude first is believed to be important because a positive attitude towards an IPE event creates a strong foundation for future uptake of IPE. To further support this claim, a review of the National Center for Interprofessional Practice and Education's Resource Exchange revealed that of the 26 available meaursement tools 10 of them focus on student attitude (N.C.I.P.E., 2013).

IPE at the University of Washington

In 2010, a group of faculty at the University of Washington revitalized the university's IPE efforts with a couple of seminars that grew into the current IPE

Foundation Series. One of these original seminars, focusing on error disclosures within the healthcare setting, has anecdotally been a student favorite and a strong, consistent, and robust teaching tool for IPE. Consistency and robustness are very important qualities for an IPE teaching tool because of the unique challenges of teaching IPE such as limited faculty training, time and logistic restraints, and overall IPE curriculum content and integration (Sunguya, Hinthong, Jimba, & Yasuoka, 2014). Taking an example from the Error Disclosure IPE event, every year different faculty members, with a wide range of both IPE and teaching experience, teach due to availability. This coupled with only 1-2 hours of time available for faculty training, illustrates how the teaching tool its self must be robust to provide consistent education at the hands of such a wide variety of instructors. Essentially the ideal IPE teach tool is one that can be executed by just about anyone with minimal training.

Error disclosure educational event

The Error Disclosure educational event is a 2-hour long workshop that starts with a general session followed by a small group breakout session. Although the workshop has had some modifications with format and number of participants (see table 3), the content of the course remains consistent. The purpose of the general session is to provide informative instruction about medical errors, team management of error disclosure, and the value of an apology. The small group breakout session provide an opportunity for the students to practice the didactic content through a role-playing exercise.

The secondary purpose of the whole workshop is the application and practice of IPE skills such as professional communication, learning clinical roles of different professionals, teamwork, and respecting others' views. It is common in IPE to use a clinical topic, such as error disclosure, as a vector for teaching IPE (Hall & Zierler, 2014). An educational vector allows for the transfer and development of skills beyond those explicitly stated. The objectives of the workshop are reflective of both goals and are demonstrated in the assessment tool used.

Hypothesizes

In order to investigate this anecdotally claim, four years (2011-2014) worth of Error Disclosure IPE event evaluation data will be analyzed to address three key questions;

The first question, and perhaps the first step in understanding the value of this educational event, is **are students satisfied with the Error Disclosure educational event?** As discussed, satisfaction or attitude is a common measurement in the IPE field and is theorized to be the foundation for future student learning.

The secondly, **is the Error Disclosure educational event a robust and consistent educational tool for IPE?** This question is valuable because it speaks to the educational event's ability to be transferred and used in future settings. To answer this question, I will look at the variation in the student total score based on the variables year and profession. Theoretically if the educational event is robust there will be little to no relationship between year and score and profession and

score. Stated another way, if year and profession account for a minimal amount of the variation in the total score then theoretical the educational event is robust.

During the creation of this event, it was theorized that the topic of error disclosure could function as a vector allowing IPE content to be taught implicitly through demonstration and student discovery. Therefore, my third research question is: **Does error disclosure work as an effective teaching vector for IPE as evident by the students' comments?** To answer this question, I will look at the qualitative results using directed content analysis.

Methods

Measurement tool

The measurement tool (see appendix A) being used for this event is a modified satisfaction survey. The purpose of this satisfaction scale is to provide structured feedback about the student's opinion of the workshop. As previous discussed, much of the current IPE research focuses on student learning outcomes especially surrounding the concept of student reaction. Satisfaction is a common focus when measuring student reaction. The survey is comprised of three parts. The first part is basic demographic information include profession and group. Part two consists of several questions about student satisfaction with the various components of the event with a 5-point Likert scale (strongly disagree to strongly agree). Do note that the survey used in 2011, 2012, and 2013 contained 7 questions, where as the 2014 survey contained 6 of the 7 questions due to the modification of the general session (see table 3 for explanation of modifications).

The scale is written in such a way that the first 4 questions (Q1, Q2, Q3, and Q4) are grouped and the last 3 questions (S1, S2, and S3) are grouped. However, factor analysis demonstrated that there is only one concept being measured so the scores will be analyzed without grouping (see appendix b). The third part of the survey consists of 2 open-ended questions in which students were able to free text whatever they chose to express. On average 90% of students answered open-ended question one and 52% answered open-ended question two (see table 4 for breakdown by year and questions).

Data collection

The measurement tool was administered via paper pencil at the completion of the event by the faculty. UW IRB approval was sought and granted by the original research team. Students were not given any additional instructions other then what was stated on the survey and participation was optional. Students consented to the use of the data by completing and submitting the survey. The author of this research did not design the collection method or participate in data collection. Data entry was collected by hand using excel spreadsheets and original surveys were destroyed. Although the data does contain "group" as a demographic variable (based on their small group assignment) there is no way to link individuals to groups. Partially completed surveys were entered into the excel spreadsheets but were removed for specific parts of the analysis (more details to follow).

This research project will be performing secondary analysis of both the quantitative (part 2 of the survey) and qualitative (part 3 of the survey) data to

investigate the research questions. UW IRB for the secondary analysis was sought and was determined to be unnecessary (see appendix C).

Analysis plan

Each hypothesis question has a unique analysis plan (see figure 2 for pictorial details). Ultimately, the project consists of two different quantitative statistical procedures and a qualitative directed content analysis. Although this project does contain both quantitative and qualitative data, the analysis plan is not influenced by mixed method methodology. Rather, the qualitative data is being categorized and counted as if the words are numbers and another piece of evidence to illuminate the quantitative results (Morgan, 1993). Table 5 contains the basic demographic information, sample size by year and profession, for the data. The total sample size is 1658 students from 4 years (the least amount of student in 2011 at 332 and the most amount of students in 2013 with 457).

Data preparation

1. All data was entered into excel spreadsheets manually by year and part (one spreadsheet for the quantitative/ part 2 of the survey and qualitative/part 3 of the survey)
2. For the quantitative (part 2 of the survey) data, all surveys were entered in regardless if complete
3. For the qualitative (part 3 of the survey) data, only surveys with data were entered with an average response rate of 90% for the 1st question and 57% for the 2nd question (see table 4)

4. Note the two parts of the data was treated separately and completion of one part did not depend on the completion of the other part
5. Any returned blank surveys were discarded and not counted because research team could not determine if it was simply an extra survey returned or if it represented a non-participating student. Therefore, it is impossible to calculate the total response rate. Based on antidotal evidence, the yearly sample size is very similar to the expected number of students invited to attend the IPE session suggesting a high overall response rate.

Quantitative analysis

These data will be analyzed with two different statistical techniques using SPSS 21. With each technique the data will be cleaned a little differently so each technique will be descripted separately in a step-by-step process.

Descriptive analysis.

1. Continue analysis with **all the data** including partially completed data
2. Separate data about General session (since it no longer pertained to the 2014 data and to allow for comparisons across years) from the result of the data
3. Run descriptive analysis on all remaining data
4. See table 6 for results
5. Run descriptive analysis on the general session data for the available three years

6. See table 7 for results

Regression analysis.

1. Remove all missing data, there was only 20/1658 or 1.2% of data that was incomplete
2. Remove General session data (since it no longer pertained to the 2014 data and to allow for comparisons across years)
3. Create a "total score" for each student (summing all their individual score) to be used as the dependent variable
4. Run regression analysis via SPSS using dummy variables representative of year and profession as independent variables
5. See table 8 for results

Qualitative analysis

The qualitative data comes from the third portion of the survey and consists of the student's words in response to two open ended questions. See table 4 for student response rates to each question based by year. Each question was analyzed individually with a directed content analysis approach. A directed content analysis approach is a variation on content analysis that uses a predetermined coding scheme taken from the literature or preexisting frameworks (Hsieh & Shannon, 2005). The coding scheme for each question was devised from expert opinion and the literature, and guided by the research questions which some label as latent pattern coding scheme. The advantage of using a latent pattern coding scheme for your directed content analysis is that it is rooted in theory and the accuracy of the

coding is relatively valid (Potter & Levine‐Donnerstein, 1999). High validity is expected because the task of coding relies on the coder's ability to understand the scheme and then recognize patterns. Both understanding and recognizing patterns are easier task then what is required for other forms of coding. The disadvantage of using a latent pattern coding scheme is that reliability depends on the coder's consistent application of the scheme(Potter & Levine‐Donnerstein, 1999).

The coding scheme for the first question was influenced by the Interprofessional Education Collaborative (IPEC)'s core competencies (Panel, 2011) for IPE. The core competencies indicate a well-accepted list of skills that reflect the learning objectives of IPE so it was felt this would be an appropriate coding scheme for assessing if students were learning IPE skills. In addition to the core competencies skills, two other more generic codes, logistics and error disclosure knowledge, were added for other expected student comments.

The coding scheme for the second question was a binary—either the comment stated something that represented IPE or did not. Once again the IPEC's core competencies were used to help assess if the comment represented IPE or not. Although this question's data contained lots of other interesting and valuable information such as logistic suggestions ("don't do this event the same week as a big test"); the binary scheme was felt to be the most appropriate for addressing our research question.

The researcher completed the coding of the data with spot-checking by an experienced content expert to increase reliability and consistency. See graph 9.1 and graph 9.2 for results and appendix D for detailed coding results.

Discussion of results

The results will be discussed in relationship to each hypothesis with overall discussion of the implications of this project.

Are students satisfied with the Error Disclosure educational event?

Yes, the data indicates that students are satisfied with the Error Disclosure educational event. Referencing back to table 6 demonstrates that regardless of the questions or the year, students reported a mean score of greater then 4. Applying that mean score of greater then 4 back to the original 5-point Likert scale, it tells us that on average students are ranking just under strongly agree. Although this is only descriptive data, which prevents one from making statements about significance, the consistency of the averages provide basic reassurance that student satisfaction is being met across the questions. However, table 7 serves as evidence that students were not completely satisfied and are able to indicate so on the measurement tool. The mean scores of the general session (which was removed from the event in 2014, see table 3) are lower in the 3-4 range.

To strength this argument; t-tests could be run between years, professions, or the various questions themselves to ensure that satisfaction does not significantly vary across those variables.

Is the Error Disclosure educational event a robust and consistent educational tool for IPE?

This project theorized that the data from a robust consistent education tool would exhibit little to no relationship between year and score and profession and

score. Based on this theory, yes the Error Disclosure educational event is a robust consistent educational tool. Only 7% of the variance in the total score can be accounted for by the profession of the student or the year in which they participated (see table 8) which one can agree indicates a minimal amount.

It would interesting to further investigate what other variables do account for the variation in the total score. Possible variables could be small group assignment, faculty assignment, gender, age, and previous interprofessional experience; unfortunately data is not available for those variables in this data set.

Does error disclosure work as an effective teaching vector for IPE as evident by the students' comments?

Based on the results of the qualitative direct content analysis (see graph 9.1 and 9.2 and appendix D) this IPE educational event is an effective teaching vector. It was theorized that if this IPE educational event was an effective teaching vector then the IPE content measures (which with graph 9.1 includes values and ethics, roles and responsibilities, communication, and teams and teamwork and with graph 9.2 includes IPE statements) should account for the majority of statements (>50%). Results of question one (graph 9.1) indicated that 51% of all statements reflect IPE content. This supports that even though students were explicitly being taught about error disclosure they were also able to learn the implicit IPE curriculum.

The results of question two (graph 9.2), which demonstrate that only 22% of all statements reflect IPE content, are less supportive of this hypothesis. However, question two was an extremely open-ended question that allowed students the completely freedom to comment or reflect on the whole event. Therefore, it is

questionable if this question should even be used to as supportive data as it likely has minimal content validity. Perhaps the more informative data from question two is not how the statements divide into themes but rather the student's actual words. Statements such as "a good example would have been helpful" or "more time for discussion with other students from other disciplines" are valuable feedback for curriculum and process improvement.

Implications of this project

This project has a couple of implications for the UW Error Disclosure educational event as well as the IPE community in general. First of all, the positive nature of the analyses supports the continued funding and valuing of the Error Disclosure education event. This event is an educational win; students enjoy it and they appear to be learning both the explicit and implicit curriculum content. Also the fact that after 4 years of replicating and changing the event it still produces positive student feedback supports that the event is sustainability. Hopefully, having a completely analysis will useful for the coordinators of this event in the present and the future.

This project can also provide some insight for the larger IPE community. First of all it demonstrates what one successful IPE event looks like. Secondly, it supports the idea of using vectors to teach IPE content, an area in which there is minimal research.

Overall, this project is a beginning voyage into the realm of assessing IPE and student learning for the author. This project has allowed the author to explore

educational research concepts and apply then in theory and in practice but still remain tied to the limits of real life.

Thesis end product

Dissemination of research findings is a very important and a plan to do so should be apart of every research program. The Journal of the American Medical Association just recently published a call for papers with a medical education theme(Golub, 2015) which my fellow authors and I are planning to submit an article for. The submission deadline is June 1, 2015. Due to the need to tailor the article to both the journal's requirements as well as the natural compromising process of co-authorship, I expect that article to look different then the project described here. However, all the background research and data analysis that has been completed will be made available to the co-authors during the writing process. This author will contribute, in addition to the previously stated background research and data analysis, writing to the methods and results sections of the paper. See appendix E for a draft of the paper.

References

Fletcher, K. E., Furney, S. L., & Stern, D. T. (2007). Patients speak: what's really important about bedside interactions with physician teams. *Teach Learn Med, 19*(2), 120-127. doi: 10.1080/10401330701332193

Golub, R. M. (2015). Medical education theme issue 2015, call for papers. *Journal of the American Medical Association, 10*, 313. doi: doi:10.1001/jama.2015.1960

Hall, L. W., & Zierler, B. K. (2014). Interprofessional Education and Practice Guide No. 1; Developing faculty to effectively facilitate interprofessional education. *J Interprof Care*, 1-5. doi: 10.3109/13561820.2014.937483

Hammick, M., Freeth, D., Koppel, I., Reeves, S., & Barr, H. (2007). A best evidence systematic review of interprofessional education: BEME Guide no. 9. *Med Teach, 29*(8), 735-751. doi: 10.1080/01421590701682576

Headrick, L., Crain, E., Evans, D., Jackson, M., Layman, B., & Bogin, R. (1996). National asthma education and prevention working group report on the quality of asthma care. *American Journal of Respiratory and Critical Care MEdicine, 154*, S96-118.

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qual Health Res, 15*(9), 1277-1288. doi: 10.1177/1049732305276687

James, T. (2002). Improving outlook. *Australian Doctor, 17*(May), 41-42.

Litaker, D., Mion, L., Planavsky, L., Kippers, C., Mehta, N., & Frolkis, J. (2003). Physican-nurse practitioner teams in chronic disease managment: the impact

on costs, clinical effectiveness, and patients' perception of care. *J Interprof Care, 17*, 223-237.

Mitchell, P., Wynia, M., Golden, R., McNellis, B., Okun, S., Webb, C. E., . . . Von Kohorn, I. (2012). Core Principles and values of effective team-based health care. Washington DC: Institute of Medicine.

Morgan, D. (1993). Qualitative content analysis: a guide to paths not taken. *Qual Health Res, 3*(1), 112-121.

N.C.I.P.E. (2013). Measurement Instruments. Retrieved April 2015, from https://nexusipe.org/measurement-instruments?f[0]=im_field_specialty_criteria%3A576

Olenick, M., Allen, L. R., & Smego, R. A., Jr. (2010). Interprofessional education: a concept analysis. *Adv Med Educ Pract, 1*, 75-84. doi: 10.2147/amep.s13207

Panel, I. E. C. E. (2011). Core competencies for interprofessional collaborative practice: Report of an expert panel. Washington, D.C.: Interprofessional Educaiton Collaborative.

Potter, W. J., & Levine‐Donnerstein, D. (1999). Rethinking validity and reliability in content analysis. *Journal of Applied Communication Research, 27*(3), 258-284. doi: 10.1080/00909889909365539

Reeves, S., Perrier, L., Goldman, J., Freeth, D., & Zwarenstein, M. (2013). Interprofessional education: effects on professional practice and healthcare outcomes (update). *Cochrane Database Syst Rev, 3*, Cd002213. doi: 10.1002/14651858.CD002213.pub3

Schofield, R., & Ameodeo, M. (1990). Interdisciplinary teams in health care and human services: are they effective? *Health and Social Work, 24*, 210-276.

Sunguya, B. F., Hinthong, W., Jimba, M., & Yasuoka, J. (2014). Interprofessional education for whom?-challenges and lessons learned from its implementation in developed countries and their application to developing countries: a systematic review. *PLoS ONE, 9*(5), e96724. doi: 10.1371/journal.pone.0096724

Thackwray, B. (1997). *Effective Evaluation of Training and Development in Higher Education*. London: Kogan Page.

Wade, D., Gage, H., Owen, C., Trend, P., Grossmith, C., & Kaye, J. (2003). Multidisciplinary rehabilitation for people with Parkinson's disease: a randomized controlled study. *Journal of Neurology: Neurosurgery and Psychiatry, 74*, 158-162.

WHO. (2010). Framework for action on interprofessional education & collaborative practice. . Retrieved April, 2012, from http://whqlibdoc.who.int/ hq/2010/WHO_HRH_HPN_10.3_eng.pdf

Zwarenetien, M., Goldman, J., & Reeves, S. (2009). Interprofessional collaboration: effects of practice-based interventions on professional practice and healthcare outcomes. *The Cochrane database of systematic reviews, 3*, CD00072.

Tables, Figures, and Charts

Figure 1: Kirkpatrick's four-level model of educational outcomes

Kirkpatrick's four-level model	**Interpretive modification for use with IPE research (Hammick et al., 2007)**
Level 1: Reaction	Learner's views on the learning experience and its interprofessional nature
Level 2: Learning	Learner has: a) Modification of existing perceptions and attitudes b) Acquisition of new knowledge and skills
Level 3: Behavior	Learner is able to transfer learning to practice setting
Level 4: Results	Learner's behavior results in: a) Wider changes in the organization and delivery of care b) Improvements in health of patients

Figure 2: Analysis Plan

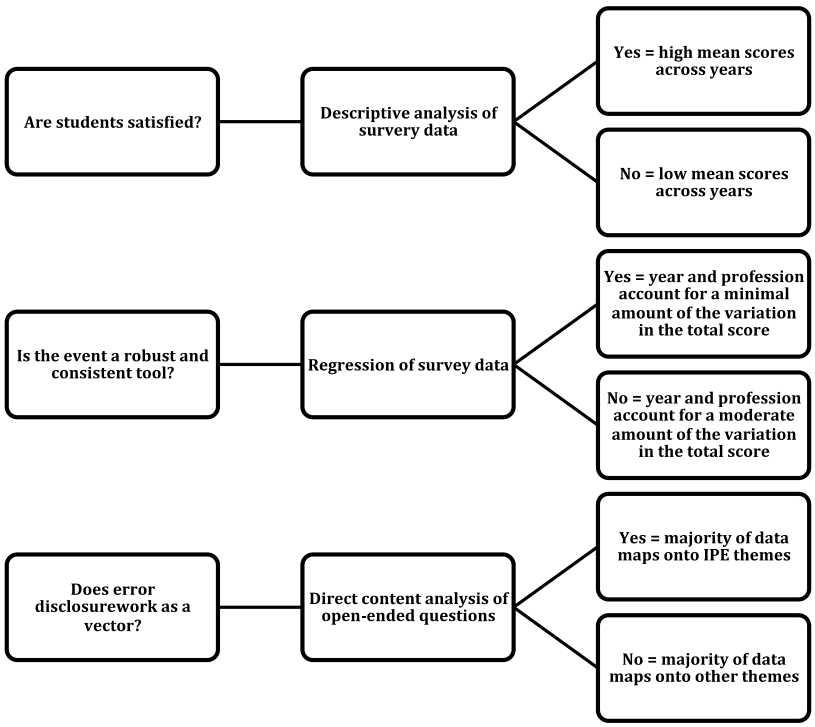


Table 3: Evolution of the Error Disclosure Event

Year	Evolution
2011	Expanded the number of participants from the small 2010 pilot *(data not be evaluated here)* No change in format of the event
2012	Expanded the number of participants Required educational event for nursing, pharmacy, and medical students No change in format of the event
2013	No change in number of participants No change in format of the event
2014	No change in number of participants The general session portion of the workshop is replaced with a short film with the same content that is viewed by the students in their small groups

Table 4: Qualitative Question Response Rate by Year

Year	Question 1	Question
2011	90% response	48% response
2012	97%	58%
2013	89%	53%
2014	83%	47%
Total average	90%	52%

Table 5: Demographic Data

Year	Total Student Participants	Medical Students	Nursing Students	Pharmacy Students	Physician Assistant Students	Dentistry Students	Medical Administration Students (MHA)	Dietetic Students	Law Students	Unidentified Students
2011	332	197	55	40	38	1	0	0	0	1
2012	413	206	133	71	1	0	1	0	0	1
2013	457	200	120	86	36	0	12	0	0	3
2014	456	157	110	54	53	52	16	8	3	3
Total	1658	760	418	251	128	53	29	8*	3*	8*

* The disciplines of students are merged together as one group for the regression analysis due to small group sizes

Table 6: Descriptive Analysis Results

Mean Score on each item by year (SD in ()); Each item's score is out of 5 which indicates "strongly agree"

Year	The facilitators' feedback was helpful	Overall, the facilitators contributed to my overall learning	I felt I had the opportunity to participate in the small group	Learning with other professional students was valuable	The small group skills practice was a useful and interesting learning opportunity	Thinking about error disclosure from a team perspective was helpful
2011	4.75 (0.54)	4.75 (0.55)	4.72 (0.64)	4.68 (0.60)	4.49 (0.68)	4.73 (0.58)
2012	4.79(0.43)	4.79 (0.48)	4.83 (0.45)	4.85 (0.43)	4.77 (0.49)	4.81 (0.45)
2013	4.63 (0.67)	4.68 (0.64)	4.67 (0.70)	4.64 (0.66)	4.58 (0.69)	4.67 (0.67)
2014	4.44 (0.83)	4.45 (0.83)	4.48 (0.80)	4.35 (0.83)	4.31 (0.83)	4.45 (0.78)

Table 7: Descriptive Analysis Results for General Session

Mean Score on item removed (SD in ()); Each item's score is out of 5 which indicates "strongly agree"

Year	The General Session was useful and interesting
2011	3.62 (0.88)
2012	4.48 (0.80)
2013	3.69 (1.03)

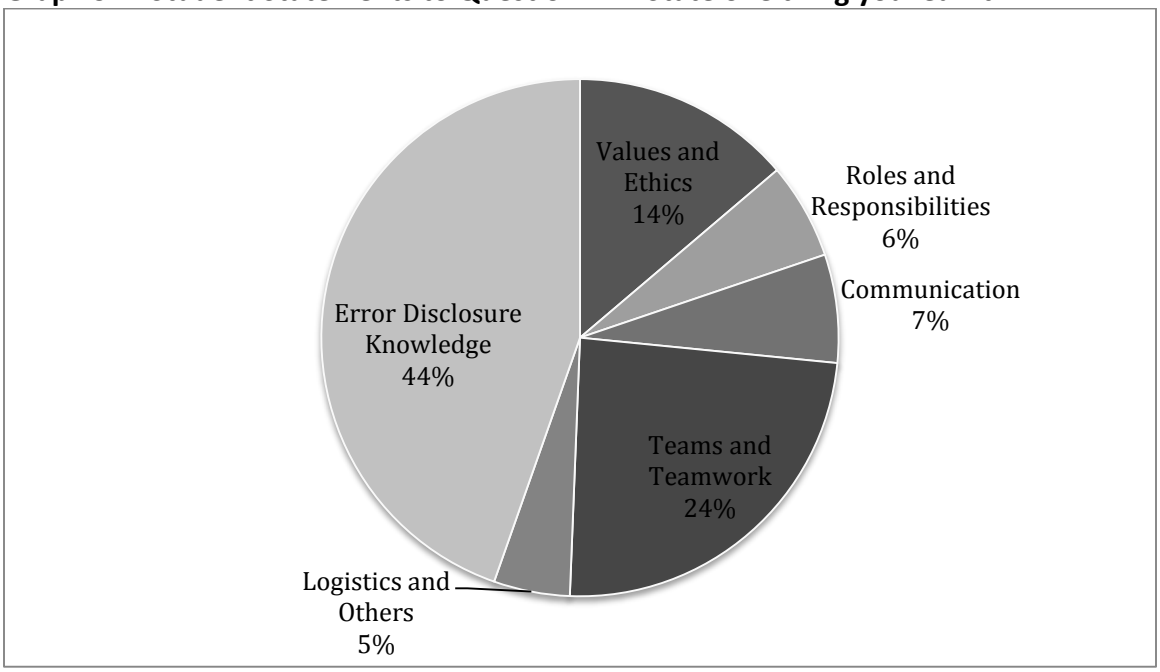
Table 8: Regression Analysis Results

			Standard Regression			
	R^2	*Pseudo R^2*	*b*	*(SE)*	*Sig.*	*Beta*
Total Score	*.08*	*.07*				
Intercept			28.12	0.18	***	-
Nursing Students			-0.28	0.20		-0.04
Dentistry Students			-1.31	0.49	**	-0.07
Pharmacy Students			-0.91	0.24	***	-0.10
Health Administration Students			0.09	0.65		0.00
Physician Assistant Students			0.02	0.32		0.00
Other Students			-0.28	0.78		-0.01
2012			0.97	0.22	***	0.13
2011			0.16	0.24		0.02
2014			-1.25	0.23	***	-0.17

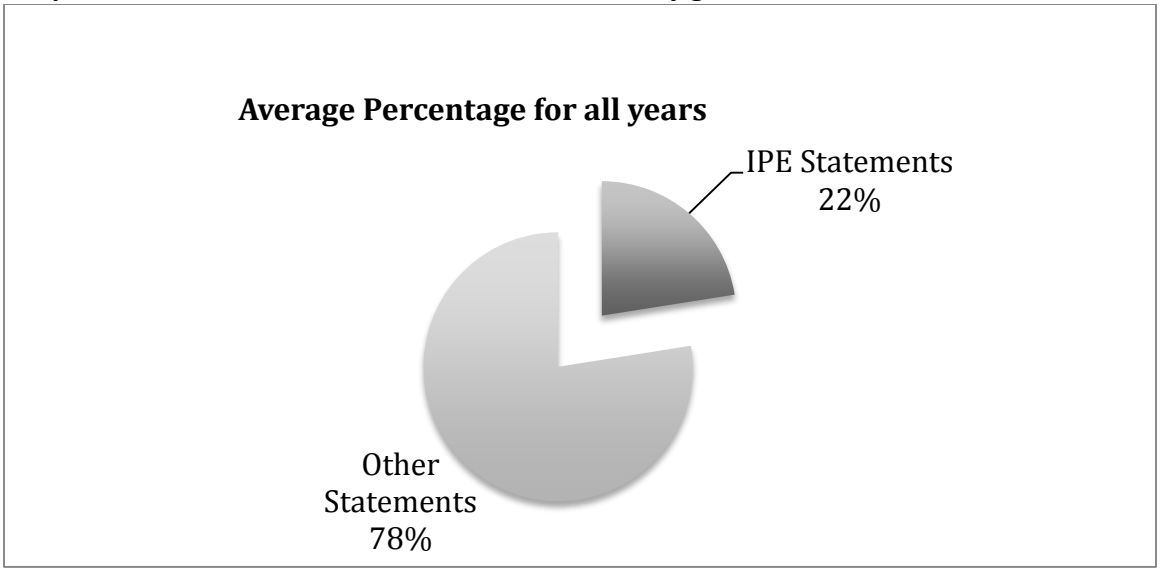
* $p < .05$, ** $p < .01$, *** $p < .001$. Comparison groups are Medical Students and 2013

Graph 9: Qualitative Analysis Results

Graph 9.1. Student Statements to Question #1 " State one thing you learnt"



Graph 9.2 Student Statements to Question #2 "Any general comment"



Appendixes

Appendix A: Survey Tool

Course Name: All Health Professions: Error Disclosure
Course Date:

SMALL GROUP ROOM NUMBER: _____

School: SoM _____ SoN _____ SoPharm _____ PA_____ MHA_____

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Overall Evaluation

	Strongly Disagree				Strongly Agree	Not applicable
The general session at 2:30 was useful and interesting.	1	2	3	4	5	N/A
The small group skills practice was a useful and interesting learning opportunity.	1	2	3	4	5	N/A
Learning with other professional students was valuable.	1	2	3	4	5	N/A
Thinking about error disclosure from a team perspective was helpful.	1	2	3	4	5	N/A

Small Group Facilitation Evaluation

	Strongly Disagree				Strongly Agree	Not applicable
The facilitator/s' feedback was helpful.	1	2	3	4	5	N/A
I felt I had the opportunity to participate in the small group.	1	2	3	4	5	N/A
Overall, the facilitator/s contributed to my overall learning.	1	2	3	4	5	N/A

Please share one thing you learned today that you plan to apply in your future practice:

_____

_____

_____

_____

Please share any other comments you might have:

_____

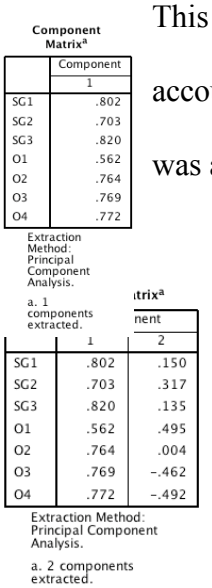
_____

_____

Appendix B: Factor Analysis

Primarily analysis of the measurement tool lead to questions about validity spurring the researcher to conduct a series of estimated factorial analyses (EFA) with SPSS. EFA is a statistical process that analyzes the relationship between items on a measurement and attempts to explain their relationship by clustering the items into factors. The results of the series of EFA suggest that there is only one factor for this survey. The various EFA ran suggest that there maybe a second factor but really can not define was it is therefore, this survey measures one factor and all the items are interrelated with each other.

1) Un-rotated PCA with eigenvalues >1



Component Matrix[a]

	Component
	1
SG1	.802
SG2	.703
SG3	.820
O1	.562
O2	.764
O3	.769
O4	.772

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

This traditional EFA model found that all the items loaded on to 1 factor, which accounted for 55.66% of the variance. Although these results are appropriate, I was a little concerned that more variance could not be explained, that O1's loading is only 0.562, and that the spree plot appears to have 2 lines with different slopes which usually indicates 2 factors. Therefore, by looking at the results of the variance explained output, I decided to run another EFA with my eigenvalue lowered to >0.8.

2) Un-rotated PCA with eigenvalues >0.8

	1	2
SG1	.802	.150
SG2	.703	.317
SG3	.820	.135
O1	.562	.495
O2	.764	.004
O3	.769	-.462
O4	.772	-.492

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

By liberating the eigenvalue, the component matrix now predicts 2 different factors that account for about 67% of the variance. However, by looking that the component matrix, the specific loading factors seem to indicate that all the items load onto factor 1 but it's not clearly distinguishable. O1 is particularly hard to determine which factor it loads on to. Therefore, I chose to run a rotated EFA to see if there is a clear component matrix possible.

3) Varimax rotation with eigenvalues >0.8

Rotated Component Matrix[a]

	Component	
	1	2
SG1	.678	.455
SG2	.724	.266
SG3	.680	.477
O1	.748	.040
O2	.549	.532
O3	.226	.868
O4	.207	.892

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Varimax rotation was chosen because it s used when one theorizes that the two factors present in this measure are not correlated to each other but rather orthogonal. However, as one can see from the rotated component matrix this rotation makes the ability to distinguish which items go with which factor even harder. Therefore, I will attempt to run a different rotated EFA.

4) Promax rotation with eigenvalues >0.8

Pattern Matrix[a]

	Component	
	1	2
SG1	.635	.252
SG2	.767	.006
SG3	.629	.278
O1	.887	-.275
O2	.449	.400
O3	-.076	.942
O4	-.109	.979

Extraction Method: Principal Component Analysis.
Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Promax rotation is used when its theorized that the different factors maybe correlated. I did not originally theorize that but after further thought and by looking at the previous results, I ran promax rotation. This rotation did clear up the loading for some of the items suggesting that SG1, SG2, SG3, and O1 are one factor and O3 and O4 are one factor. However, it is unclear which factor O2 should belong to.

Appendix C: Qualitative Results

QUESTION: State one thing you learnt:

Themes (IPEC Core Competencies)	Year	Percentage of Statements	Example
Values and Ethics for Interprofessional Practice	2011	16% (47/300)	Be a person It is so important to be honest in your disclosure and to sincerely apologize upfront. No one can listen or forgive until they are emotionally ready. Disclose even when you don't want to Its ok to admit fault
	2012	13% (52/400)	Owning a mistake and apologizing is absolutely critical Do not try to hide the truth Be flexible and honest Patient-centered care is key
	2013	13% (51/408)	Being open and honest gets better results Standards of integrity are vastly improving Take responsibility Telling the truth is its own medicine
	2014	13% (50/377)	Be warm first, competent second Empathy It is ok to apologize Be open
Roles and Responsibilities	2011	8% (24/300)	It was great to see each team member possessing a sense of responsibility. I will carry that throughout my career. Each individual's role in addressing the pt concerns Balance accountability personally among team members with system concerns Taking responsibility for action, backing up team members
	2012	7% (27/400)	I learned more about other health care professionals' roles I learnt how complex patient care is and how spread

			out responsibility of care can be between different disciplines The most valuable thing was listening to the articulation of different students and the points they focused on. I learnt today that all the team members may be Responsible
	2013	4% (16/408)	I learnt about the perspective of those in other health professions and what they see their role as in error disclosure I learnt more about the role of pharmacists and I learned about discussing care events from each profession's perspective Great input from other professions It was interesting to see the priorities of other professions
	2014	5% (20/377)	It was nice learning a little about the perspective of hospital administration It was helpful for me to hear the perspectives of the other professions That administrators can play a supportive role in helping clinicians disclose errors Recognize everyone's roles in errors
Interprofessional Communication	2011	10% (31/300)	Importance of team discussion prior to error disclosure, I found this vital to future practice. Clarifying anything I doubt and using a lot of communication with the other disciplines. Importance of clear communication with other health care team members
	2012	7% (29/400)	I plan to work further to communicate well with all members of the team Being able to communicate with other health care providers is extremely important. I will definitely work on my nonverbal communication

			Respect power differentials and how body language may have an unintentional effect
	2013	5% (19/408)	Communication goes in both directions The importance of getting to know the other health professions you work with and being able to communication with them well Effective and efficient communication with other professionals Good communication among members of the team is essential
	2014	5% (18/377)	The importance of open communication and making sure everyone is on the same page Listen to all members of team How to work closely and integrate communications I plan to practice good communication with all health professions
Teams and Teamwork	2011	31% (94/300)	That even though we all have our roles as a team we need to be able to work together to problem solve and learn so that we don't make the mistakes that harm our patients. Providing competent and comprehensive care is a must, continuing supportive teamwork not only helps the patient but everyone involved. Importance of being able to work within the team and teamwork.
	2012	24% (94/400)	You can really count on your team to support each other I hope to use a team approach not only in disclosing errors, but in any treatment decisions Teamwork! Often errors are multi-faceted, it's a team apprioach in medicine, not just a one person show
	2013	21% (87/408)	I learnt that the team is a very supportive unit. They help build trust, displace blame, and provide back-up The importance of not only being a team when disclosing an error, but making the

			family/patient be an integral part of the team as well.
	2014	20% (76/377)	Team dynamics Teamwork is essential when dealing with difficult situations How to collaborate a response as a team Allowing all members of the team to share ownership in mistakes
Logisitics, timing, and other general comments	2011	1% (3/300)	Extremely valuable Just getting practice was nice. There are skills that need to be practiced.
	2012	4% (17/400)	Having the family member be an outside person made it feel very realistic as well I really appreciated the faculty feedback This was an invaluable experience I really enjoyed being place in a position to work with both a patient and a team
	2013	7% (30/408)	Good practical topic Use of interdisplinary group scenarios for simulation rather than 1 person simulation is much better Great practice The room was too small
	2014	7% (27/408)	Always appreciate annual retraining in the small things which we at times dismiss as not important Role play scenarios give the same emotional response as real with out the responsibility I was able to actually feel how nervous I would be in a real situation This makes me feel better
Knowledge specific to Error Disclosure	2011	34% (101/300)	Getting knowledge of the patients understanding of the situation is the first thing you should do. Have a plan. Asking about the level of understanding from the affected family member about their loved one's status before exploring the situation.
	2012	45% (181/400)	A plan is important to have, but be ready for the unexpected. Planning is key Error disclosure is much more about addressing the patient and family's needs

			than sharing what the care team wants to emphasize/explain I learned the key steps in team error disclosure that keep as a guideline for future practice
	2013	50% (205/408)	How to effectively deal with difficult error disclosure Say you're sorry first Methods of error disclosure I learnt today that "its not about you" its about the patient
	2014	49% (186/377)	It's important to listen to the patient's concerns rather than just trying to defend your mistake Practice error disclosure being doing it How to address a mistake in a practice, positive way Simplifying the error to the level the patient can understand is helpful

Qualitative Results—**QUESTION: Any general comment:**

Comments about teams, teamwork, or interdisciplinary learning	2011	32% (53/161)	I enjoy learning with other team members Do more interprofessional training! More opportunity to interact with other health sciences disciplines would be appreciated
	2012	34% (81/241)	More time for discussion with other students from other disciplines. Awesome opportunity to work with other health care students! We are in this building with others so we should all mingle at times This is a good exercise to get a feel of interprofessional collaboration!
	2013	16% (38/241)	It was valuable to hear different perspectives I learnt a lot about the guilt and fault of other professions feel about errors We should talk about how we blame certain professions and stereotypes
	2014	8% (17/214)	Define each professional's role Good way to start working as a healthcare team Small group collaboration is needed

			MHAs absolutely must be included in the small group discussions- we are just one member of the "medical team"
Other (including logistics, timing, location, preference of small group or lecture, etc)	2011	68% (109/161)	This was great! Please continue to do these assimilations! It would've been better if we did the small group scenarios longer. Enjoyable
	2012	66% (160/241)	I'm definitely impressed, this exercise was extremely well-executed. This was helpful. Glad I came Excellent role playing by "family member"
	2013	84% (203/241)	A good example would have been helpful
	2014	92% (197/214)	Helpful to watch video Very informative I like this small group discussion over the large one I felt like a lot of this was common sense

Appendix D: Article Draft for JAMA

Teaching error disclosure using innovative, interprofessional communication skill training.

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Introduction

The last decade of healthcare has seen an increased focus on patient safety. Numerous studies and reports have recommended a variety of strategies to address preventable adverse events [1]. One such strategy is the promotion of transparent and timely error disclosure, particularly interprofessional error disclosure, by the healthcare team to the patient and family[2-4]. Error disclosure is the process in which a healthcare provider or team communicates the occurrence and outcome of an adverse event[5] as well as apolgizes[6]. Error disclosure has been suggested to help maintain patient trust [7], mediate legal action [8], and support a culture of patient safety [1,2]. However, error disclosure is not an easy task. Studies about physician's attitudes towards error disclosure often cite self-perceived lack of knowledge and communication skills [5,7] as a barricade to timely and transparent error disclosure. Research with medical trainees continues to support this void in their education[9].

To address this concern, some have looked to the concept of interprofessional education (IPE) as a practical and meaningful method of teaching patient safety and quality improvement[10]. IPE is "healthcare professionals learning collaboratively within and across their disciplines to gain the knowledge, skills, and values required to work with other healthcare professionals"[11]. Yet IPE also has its own challenges such as scalability, timing, and logistics to meet the needs of large numbers of students across numerous professions as well as additional faculty demands [12,13].

IPE curriculum often is designed with dual objectives, one explicit and one implicit. The explicit objectives usually focus on a clinical problem or situation with

the goal of increasing student's understanding of the topic and providing opportunity for students to practice application of knowledge. The implicit objectives, similar to concept of hidden curriculum[14,15], focus on the application of interprofessional skills such as teamwork, respect for other professions, and communication skills. Combined together students practice and learn applicable clinical knowledge in a manner that supports realistic collaborative practice.

To trial this format and to teach the much needed content of error disclosure an educational intervention for health profession students was created and executed between 2010 and 2014. Evaluation of this error disclosure educational intervention centered around two key points; student satisfaction and feasibility of dual curriculum. Student satisfaction is considered to be a key precursor to learning according to Kirkpatrick's model of educational outcomes [16] and is a commonly measured variable in IPE research[17].

Description of Educational Intervention

Pilot phase

In 2010, with funding from the Josiah Macy Foundation, a small team of University of Washington content experts (Thomas Gallagher, Sarah Shannon, Andrew White, Sara Kim, Peggy Odegard) developed an interactive, skills-focused learning experience for team-based error disclosure and pilot tested it with 22 medical, pharmacy and nursing students. The pilot event consisted of three short didactic lectures followed by an interactive fishbowl demonstration of how to perform an error disclosure. Following the lectures and demonstrations students were then divided into teams of 3 (MD, RN and pharmacist) and videotaped

disclosing an error to a "patient". The "patient" was a standardized patient who was coached to respond to the student team's disclosure with first a sad affect then followed by an angry affect. This pattern of responses by the "patient" was chosen due to research that show that patients often respond with similar affects[8]. The student teams then received debriefing from faculty after each disclosure to reinforce the process and skills necessary for successful interprofessional team error disclosure.

Expansion phase

After receiving positive student outcomes from the pilot and the continued funding from the Josiah Macy Foundation, the learning event was expanded to include all 2nd year medical (197), senior BSN nursing and accelerated BSN (55), 2nd year pharmacy (40) and physician assistant students (38) (see table 1). To accommodate the dramatically increased number of learners, the learning event was revised. The three didactic lectures and interactive demonstration were combined into one general session. The didactic lecture provided key content on error disclosure, professional obligations, legal concerns, and introduction to a framework for team error disclosure. The general session consisted of a short, interactive talk on error disclosure content by a national expert (Thomas Gallagher) followed by a demonstration by three local clinicians. After the general session, students were distributed into 34 small interprofessional groups of 8-12 students to practice skills of error disclosure. Each group also included a facilitator and a "family member", both of which were volunteer faculty members from one of the UW health science colleges. The "family member" is the standardized patient to

whom the student teams must disclosure a medical error based on a inpatient case provided. Within their small groups, students were divided into three interprofessional teams and disclosed the same error to the "family member" who was trained to offer three different emotional affects. After each student team practiced disclosing, the faculty facilitator lead the group through a debrief to highlight and reinforce the content.

With continued enthusiasm, the event was once again offered in 2012 and 2013. Again attendance (table 1) was increased however, this time it was secondary to the event becoming more embedded into program expectations and the university's culture. Due to technology challenges and feedback, the fishbowl demonstration was removed from the general session but the rest of the program continued as in 2012.

Sustainability phase

In 2013, administration implemented consistent expectations for attendance within each of the participating programs making this education event an embedded element of the UW health science curriculum. Thus, in preparation for this event's 5th year (2014) it was decided to eliminate the general session. The general session was the poorest rated portion of the event and required all students to physically attend one large lecture that had become an insurmountable logistic feat. In order to continue providing the content from the eliminated general session, a 15-minute Tegrity voice-over PowerPoint was a created and presented to students as a preparation work for the event.

Methods

Measurement Tool

The measurement tool being used for this event is a modified satisfaction survey comprised of three parts. The first part is basic student information include profession and group. More traditional demographic data (i.e. gender, age etc) was not included as is the norm among IPE research. Part two consists of several questions about student satisfaction with the various components of the event with a 5-point Likert scale (strongly disagree to strongly agree). Note that the survey used in 2011, 2012, and 2013 contained 7 questions, where as the 2014 survey contained 6 of the 7 questions due to the modification of the general session. The third part of the survey consists of 2 open-ended questions to elicit student's thoughts and feedback.

Data Collection

The measurement tool was administered via paper pencil at the completion of each year's event by the faculty to all participating students (table 1). Overall, the participating students were all health science students from a large Pacific Northwest University who were required by their program to attend this intervention and this group of student demographically mirrored that of the university's student population. Students were not given any additional instructions other then what was stated on the survey and participation was optional. Students consented to the use of the data by completing the survey. Data regarding which students did not consent was not completed and response rates can only be extrapolated by comparing attendance data to sample size. Data collection process met our institutions IRB standards.

Analysis

Due to the nature of the measurement tool, both quantitative and qualitative analyses were conducted.

Quantitative Analysis

The data from part 1 and 2 of the tool was analyzed using STATA 18. For the demographic (table 1) and descriptive analysis (table 2) the data about the general session was separated but all data was used for the analysis. However, all partial data (missing any answer to any of the questions for part 2) was removed (1.2% of data) for the regression analysis.

Qualitative Analysis

The qualitative data comes from the third portion of the survey and consists of the student's words in response to two questions. Due to the wording of the second question, it was decided not to analysis this data but rather view it as data for quality improvement. The responses were analyzed based on content directed[18,19] coding schemes devised from expert opinion and the literature, and guided by the research question. On average 90% of students who submitted a survey answered open-ended question one.

The coding scheme was influenced by the Interprofessional Education Collaborative's core competencies [20] for IPE. The core competencies indicate a well-accepted list of skills that reflect the perceived learning objectives of IPE so it was felt this would be an appropriate coding scheme for assessing if students were learning IPE skills. In addition to the core competencies skills two other more generic codes, logistics and error disclosure knowledge, were added to account for

other anticipated student comments. Thematic coding was completed by one researcher (ML) with spot-checking by an experienced content expert (SS) to increase reliability and consistency.

Results

See table 1 for display of student's profession across the years. Overall the proportion of each profession remained consistent across the years 2012, 2013, and 2014 with minimal incomplete data. Descriptive analysis of the survey data (table 2) demonstrates that students rate each question between agrees and strongly agrees suggesting satisfaction across the education intervention. Further analysis of the survey data with 2 regression models (table 3) reveals that only 2% of the variance in the student's satisfaction rating is related with profession alone but does climb to 12% when group assignment is added as a covariate. Group assignment was added as a covariate because theoretically the interaction between students and students and faculty could alter the effects of the intervention. However, because group assignment was not felt to be a modifiable factor (for example; student interactions are spontaneous and organic) it was modeled as a covariate rather then an independent variable. Year was not included in either regression model because group assignment already accounts for year. Because there were significant differences seen among the professions with the regression analysis, a one-way ANOVA was performed with follow up pairwise comparison using the Bonferroni method (table 4). This analysis demonstrates that dentistry students significantly differed from the medical; nursing, pharmacy, and physician assistant students and pharmacy differed from the medical students.

The qualitative analysis (figure 1) demonstrated that 51% of the student's responses to the open-ended question "state one thing you learnt" reflected an IPE skill such as *"I learnt more about other health care professional's roles" and "listen to all members of the team".* 44% reflected error disclosure content such as "*say sorry first"* and *"how to address a mistake in a practical, positive way".* The remaining 5% of the responses addressed logistics and other comments like "*just getting to practice was nice"* and "*I was able to actually feel how nervous I would be in a real situation"*.

Discussion

The data supports that this error disclosure educational intervention is a robust learning experience that satisfies students across professions. Although dentistry student's satisfaction does differ this is felt to be a reflection of the case study being used not the overall content of the intervention. The case study being used takes place in a traditional inpatient health setting, which is not a traditional work location for dentists, making it a challenge for them to engage and realistically role-play. Further supporting the claim that this intervention is robust and replicable across years with a wide variety of students and facility is that only 12% of variation in the evaluation data is accounted for by group assignment and profession.

The ability to satisfy across professions as well as replicate across years and groups with consistency makes this intervention excellent for IPE. In addition, the qualitative results supported that students were able to learn both the explicit and implicit curriculum. Therefore, students learnt error disclosure and IPE skills

making this intervention a valuable use of time and supports that lecturing on IPE is not required to teach students the core competencies for IPP.

Limitations

There are a couple of limitations to this research. First of all the survey reflects ceiling effect[21], which is a common occurrence with satisfaction scales[22]. This clustering of the data limits the overall variation and may inhibit the research team's ability to see the full picture. Also the measurement tool used was developed specifically for this intervention and has not been validated. However, the tool performed well and the research team is only using it to make statements about satisfaction.

Conclusions

There is a need in healthcare to improve patient safety through transparent, interprofessional communication including error disclosure. To promote this change in the practice setting it must start in the classroom. Error disclosure content was identified as a gap in the curriculum of all the University of Washington (UW) health science programs. While many of the programs did provide some instruction on patient safety, errors, and disclosure, none were offering the opportunity to apply and practice such skills. Hence the creation of this error disclosure educational intervention was vital to providing relevant, innovative professional training for the next generation of healthcare providers.

Beyond the instructing of necessary content, the error disclosure intervention has evolved into a powerful learning opportunity. This event is a satisfying learning opportunity in which students report learning both error

disclosure content and IPE skills in a safe yet realistic environment. The valuable piece of this intervention is how well it stimulates internal, professional growth through the embedded professional values and the actual emotions and fears elicited by role-playing as a team. Students report learning that *all* members of the team feel a duty to the patient and experience shame, guilt, remorse, and responsibility when an error occurs. These kinds of intangible moments are invaluable to the creation of professional, progressive, and ethically safe healthcare providers.

This intervention can serve as a template for how to teach interprofessional error disclosure in a meaningful, yet feasibility way that respects the realistic limitations of student time, institutional space, and facility demands.

References

1. Leape LL, Berwick DM. Five years after To Err is Human: what have we learned? *JAMA.* 2005;291(19):2384-2390.
2. Kachalia JD. Improving patient safety through transparency. *The New England journal of medicine.* 2013;369(18):1677-1679.
3. Anwer LA, Abu-Zaid A. Transparency in medical error disclosure: the need for formal teaching in undergraduate medical education curriculum. *Medical education online.* 2014;19:23542.
4. Adhikari R, Tocher J, Smith P, Corcoran J, MacArthur J. A multi-disciplinary approach to medication safety and the implication for nursing education and practice. *Nurse education today.* 2014;34(2):185-190.
5. Wu AW, Boyle DJ, Wallace G, Mazor KM. Disclosure of adverse events in the United States and Canada: an update and a proposed framework for improvement. *Journal of Public Health Research.* 2013;2(32):186-192.
6. White AA, Gallagher TH. Medical error and disclosure. In: Bernat JL, Beresford R, eds. *Handbook of Clinical Neurology; Ethical and legal issues in neurology.* Vol 118: Elsevier; 2013:107-117.
7. Gallagher TH, Waterman AD, Ebers AG, Fraser VJ, Levinson W. Patients' and physicians' attitudes regarding the disclosure of medical errors. *JAMA.* 2003;289(8):1001-1007.
8. Gallagher TH, Denham CR, Leape LL, Amori G, Levinson W. Disclosing unanticipated outcomes to patients: the art and practice. *Journal of Patient* 9.

White AA, Gallagher TH, Krauss MJ, et al. The attitudes and experiences of trainees regarding disclosing medical errors to patients. *Academic medicine : journal of the Association of American Medical Colleges.* 2008;83:250-256.

10. Hammick M, Freeth D, Koppel I, Reeves S, Barr H. A best evidence systematic review of interprofessional education: BEME Guide no. 9. *Medical teacher.* 2007;29(8):735-751.
11. CAIPE. Defining IPE. 2002; http://caipe.org.uk/resources/defining-ipe/, 2015.
12. Freeth D, Hammick M, Reeves S, Koppel I, Barr H. *Effective Interprofessional Education: Development, delivery and evaluation.* Oxford: Blackwell Publishing; 2005.
13. Sunguya BF, Hinthong W, Jimba M, Yasuoka J. Interprofessional education for whom?-challenges and lessons learned from its implementation in developed countries and their application to developing countries: a systematic review. *PLoS ONE.* 2014;9(5):e96724.
14. Hafferty FW. Beyond curriculum reform: confronting medicine's hidden curriculum. *Academic medicine : journal of the Association of American Medical Colleges.* 1998;73(4):403-407.
15. Fins JJ, Rodriguez del Pozo P. The hidden and implicit curricula in cultural context: new insights from Doha and New York. *Academic medicine : journal of the Association of American Medical Colleges.* 2011;86(3):321-325.

16. Thackwray B. *Effective Evaluation of Training and Development in Higher Education.* Stirling, VA: Kogan Page Limited; 1997.

17. N.C.I.P.E. Measurement Instruments. 2013; https://nexusipe.org/measurement-instruments?f[0]=im_field_specialty_criteria%3A576. Accessed April, 2015.

18. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res.* 2005;15(9):1277-1288.

19. Potter WJ, Levine‐Donnerstein D. Rethinking validity and reliability in content analysis. *Journal of Applied Communication Research.* 1999;27(3):258-284.

20. Panel IECE. *Core competencies for interprofessional collaborative practice: Report of an expert panel.* Washington, D.C.: Interprofessional Educaiton Collaborative;2011.

21. Lewis-Beck MS, Bryman A, Liao TF. The SAGE Encyclopedia of Social Science Research Methods. online ed2004.

22. Andrew S, Salamonson Y, Everett B, Halcomb E, Davidson PM. Beyond the ceiling effect: using a mixed methods approach to measure patient satisfaction. *International Journal of Multiple Research Approaches.* 2011;5(1):52-63.

Table 1: Student Demographics across Year and Health Science Program

Year	Total Student Participants	Medical Students	Nursing Students	Pharmacy Students	Physician Assistant Students	Dentistry Students	Medical Administration Students (MHA)	Dietetic Students	Law Students	Unidentified Students
2011	332	197	55	40	38	1	0	0	0	1
2012	413	206	133	71	1	0	1	0	0	1
2013	457	200	120	86	36	0	12	0	0	3
2014	456	157	110	54	53	52	16	8	3	3
Total	1658	760	418	251	128	53	29	8[a]	3[a]	8[b]

[a]Dietetic and law students are combined as one profession for analysis due to small sample size

[b]this section of students are not included in further analysis

Table 2: Descriptive Results of Student's Rating of Satisfaction with Error Disclosure Educational Event

Year	Total Score (out of 30)	The facilitators' feedback was helpful	Overall, the facilitators contributed to my overall learning	I felt I had the opportunity to participate in the small group	Learning with other professional students was valuable	The small group skills practice was a useful and interesting learning opportunity	Thinking about error disclosure from a team perspective was helpful
2011	28.11 (2.79)	4.75 (0.54)	4.75 (0.55)	4.72 (0.64)	4.68 (0.60)	4.49 (0.68)	4.73 (0.58)
2012	28.83 (2.07)	4.79(0.43)	4.79 (0.48)	4.83 (0.45)	4.85 (0.43)	4.77 (0.49)	4.81 (0.45)
2013	27.87 (3.42)	4.63 (0.67)	4.68 (0.64)	4.67 (0.70)	4.64 (0.66)	4.58 (0.69)	4.67 (0.67)
2014	26.53 (4.16)	4.44 (0.83)	4.45 (0.83)	4.48 (0.80)	4.35 (0.83)	4.31 (0.83)	4.45 (0.78)

Standard deviation in ( )

Table 3: 2-Model Regression Results of Student's Satisfaction explained by Health Science Program

Regression						Regression with Group Assignment as Covariate					
	R^2	*Pseudo* R^2	*b*	*(SE)*	*Sig.*		R^2	*Pseudo* R^2	*b*	*(SE)*	*Sig.*
Total Score	*.02*	*.02*				**Total Score**	*.19*	*.12*			
Nursing Students			-0.33	0.20		Nursing Students			-0.20	0.20	
Dentistry Students			-2.58	0.47	***	Dentistry Students			-1.48	0.47	**
Pharmacy Students			-0.92	0.24	***	Pharmacy Students			-0.89	0.24	***
Physician Assistant Students			-0.46	0.32		Physician Assistant Students			0.07	0.32	
Health Administration Students			-0.55	0.65		Health Administration Students			0.04	0.64	
Other Students			-0.28	1.00		Other Students			1.24	1.00	

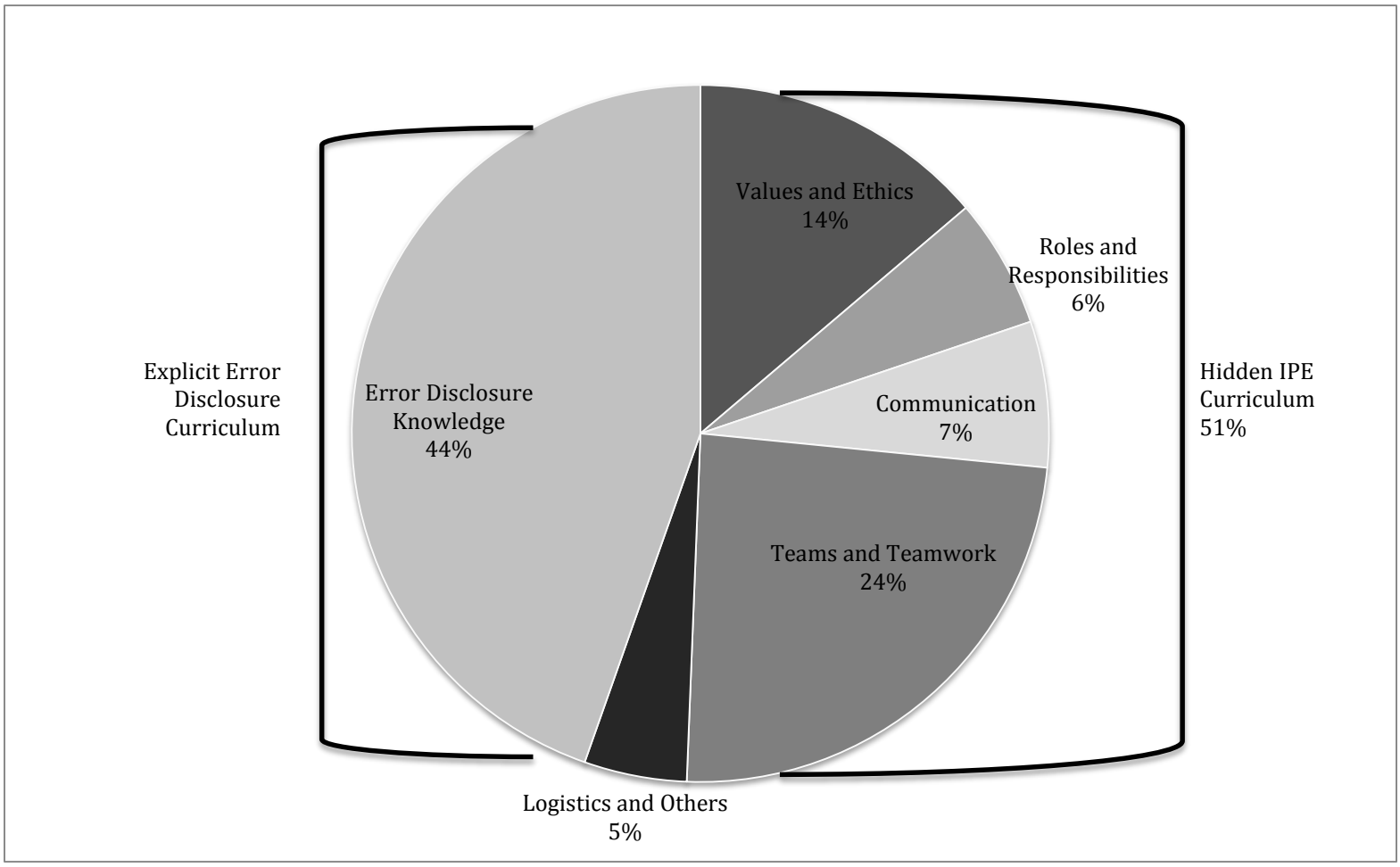
*p < .05, ** p < .01, *** p < .001.
Comparison group is Medical Students

Table 4: One-Way Anova with Pairwise Comparisons Comparing Effects of Student's Health Science Program

	F	*Sig.*	*t*	*Sig.*
Profession	*6.87*	***		
		Medicine vs Nursing	-1.63	
		Medicine vs Dentistry	-5.52	***
		Medicine vs Pharmacy	-3.84	**
		Medicine vs Physician Assistant	-1.47	
		Medicine vs Health Administration	-0.83	
		Medicine vs Other	0.29	
		Nursing vs Dentistry	-4.7	***
		Nursing vs Pharmacy	-2.27	
		Nursing vs Physician Assistant	-0.42	
		Nursing vs Health Administration	-0.33	
		Nursing vs Other	0.62	
		Dentistry vs Pharmacy	3.33	*
		Dentistry vs Physician Assistant	3.91	***
		Dentistry vs Health Administration	2.58	
		Dentistry vs Other	2.64	
		Pharmacy vs Physician Assistant	1.26	
		Pharmacy vs Health Administration	0.56	
		Pharmacy vs Other	1.2	
		Physician Assistant vs Health Administration	-0.11	
		Physician Assistant vs Other	0.74	
		Health Administration vs Other	0.71	

*p < .05, ** p < .01, *** p < .001.

Figure 1: Student Statements to the question "State one thing you learnt"



Appendix E: Human Subject IRB Letter

UNIVERSITY of WASHINGTON
HUMAN SUBJECTS DIVISION

2/23/2015

PI: Ms. Megan Lagunas
Graduate Student, College of Education

Cc: Min Li

Re: HSD reference #49114, "Secondary Analysis of Student Feedback on an Error Disclosure Educational Event"

Dear Ms. Lagunas,

The Human Subjects Division received your determination request on 2/2/2015 and the subsequent responses to our initial screening request (including the requested new determination request materials) on 2/20/2015. Your research activity described in the above-referenced determination request and correspondence has been by screened by Subcommittee EG.

As outlined in your determination request, the research activity will only involve the receipt and analysis of data that is not individually identifiable, as the data cannot be linked to specific individuals by the investigators either directly or indirectly through coding systems. Information in your determination request indicates that:

1. The private information or specimens were not collected specifically for the currently proposed research project through an interaction or intervention with living individuals;

2. The dataset does not contain any identifiers or any constellation of variables that might allow for the identification of individuals; *and*

3. The investigator does not have access to any key that could be used to link identifiers to data; that is, no investigator(s) involved in the research are able to readily ascertain the identity of the individuals to whom the information pertains.

Given this information and the definition of "human subject" under 45 CFR 46.102(f), the research has been determined to not meet the federal regulatory definition of "human subjects research". Therefore, you do not need IRB review and approval to perform your activities. Please keep this memo and a copy of your returned determination request for your records.

If you have further questions or concerns, feel free to contact me.

Best regards,

Bailey Bell
Human Subjects Review Administrator
Minimal Risk Subcommittee EG
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bbell3@uw.edu

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