RESEARCH

Insights From the Defining Issues Test on Moral Reasoning Competencies Development in Community Pharmacists

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Objective. To investigate whether a profession-specific educational intervention affected the development of moral reasoning competencies in community pharmacists, as measured by the Defining Issues Test (DIT2).

Methods. This research used a repeated measures pre-post educational intervention design as a quasi-randomized, controlled, crossover study to evaluate changes in the moral reasoning scores of 27 volunteer community pharmacists in Ireland.

Results. Changes in pharmacists' moral reasoning competencies development, as reported by P-Scores and N2-Scores, were found to be significant. In addition, interaction effects were observed between developmental scores on the DIT2 and whether participants were determined to be consolidated in their reasoning pre- and post-engagement with the educational intervention.

Conclusion. Short profession-specific educational interventions have the potential to positively affect the development of moral reasoning competencies of community pharmacists.

Keywords: moral reasoning, competencies, defining issues test, community pharmacists

INTRODUCTION

Research show that higher levels of moral reasoning competencies, as measured by a survey form of psychometric measure known as the Defining Issues Test (DIT2), increase the probability that health care professionals will make decisions in the patient's best interests and/or report errors.[1-4] Supported by Neo-Kohlbergian theory, known validity criteria for the DIT2 conclude that scores increase with age and after engagement with profession-specific educational interventions.[1,5-7] However, research by Latif and Berger indicates that community pharmacists are a rare exception to the expectation that moral reasoning scores increase with age.[8,9] Neo-Kohlbergian theory proposes that identified deficits in moral reasoning might be addressed by engagement with educational interventions appropriate to the context in which community pharmacists practice pharmacy.[1,2,10] The objective of this study was to investigate whether an educational intervention incorporating peer discussion surrounding profession-specific dilemmas affected the development of moral reasoning competencies in community pharmacists working in Ireland.

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Moral reasoning is concerned with the cognitive or thinking processes that individuals go through to arrive at a decision when faced with a dilemma.[1] Consistent with Kohlberg's theory of cognitive moral development,[1,11] Neo-Kohlbergian theory proposed that "an individual processes or interprets experience according to organising, conceptual structures in the mind that develop from and are influenced by experience."[12] In order to reason through a dilemma, these conceptual structures, referred to as "schemas," activate automatically without awareness. However, whereas Kohlberg's stages are generally defined in terms of cognitive operations, Neo-Kohlbergian (meta) schemas represent a network of knowledge that is organized around life events and these schemas exist to help individuals understand new information based on previous experience. Neo-Kohlbergian schema theory proposes that schemas are highly contextual and that an individual may default to different schemas depending on the presenting dilemma.[1,5,6]

In context, professional dilemma situations occur where a pharmacist is faced with two or more action options that are individually convincing, mutually exclusive and jointly demanding but none of which is ideal and all of which might be questioned by peers if subjected to external scrutiny.[1,13,14] Activation of 'reasoning' depends on an individual having acquired the competencies to identify

the ethical concepts that are in tension to create a dilemma, what actions might be justifiable, and how others might be affected by the behavior implied by each action option.[1,8] When decision-making through dilemmas, a professional will first access "surface" level guidelines provided by rules, codes and norms governing practice of the profession and, where clear guidance is not evident, "intermediate" or profession-specific concepts will then be considered.[1,10,12,15] Only where the answer to "what should be done?" is not clear, will the individual default to his/her "bedrock" schema.[1,6,16] A morally defensible outcome is the objective of the reasoning process.

The conduct of community pharmacists in Ireland, and the pharmacies in which they work, are regulated by the Pharmaceutical Society of Ireland (PSI).[17,18] Patient counselling by pharmacists is a legal requirement in Ireland, both when dispensing prescriptions and when advising with respect to over-the-counter medicines, but patients have an expectation that an appointment will not be required.[18,19] Community pharmacists do not generally have pharmacist colleagues at the pharmacy for most of their working hours, indicating that isolation and a lack of peer interaction should be of concern.[19,20,21] Recent research highlight many potential sources of dilemmas, both personal to and external to pharmacists.[13,14,21-25] The avoidance of professional dilemmas is therefore not possible for community pharmacists and decision-making through dilemma scenarios is likely to take place within strict time constraints and without direct access to pharmacist peers.[3,13,14,23]

The DIT2 measures whether deeper level "bedrock" schemas are activated (to the extent that the person has developed them) and engaged when decision-making through dilemmas.[1,5,6] These bedrock, or default, schemas focus on the macro moral level and "inform the individual's understanding of social cooperation in terms of justice and fairness within the context of law, the mechanisms of government and other social institutions."[5] However, DIT researchers clearly acknowledge that "everyday morality is much more contextually dependent than macro morality and is influenced by multiple interpretative systems that include but are not limited to the default system measured by the DIT."[5] Activation of bedrock schemas occurs when more automatic and context-specific interpretive systems fail or provide incomplete or inconsistent information, and DIT2 scores reflect broad developmental changes or inclinations regarding preferred schemas at an abstract level.

Beginning with a recognition task, the DIT2 first presents a moral dilemma in the form of a story to a participant and then presents a set of 12 statements, referred to as standard items, for the participant to evaluate. A total

of five dilemmas are considered in this manner. Reliability checks inherent in the material seek to provide a means of purging response sheets that have the potential to provide bogus data.[5,7] DIT2 items cluster around three general moral schemas ie, arguments that appeal to personal interest (PI), to maintaining social rules, norms and codes (MN), or to moral ideals and/or theoretical frameworks for resolving complex moral issues (PC or P-Score). The respondent's task is to rate and rank these standard items in terms of their perceived moral importance for the protagonist in the story. The proportion of items that appeal to each given schema's considerations, as selected by respondents, is reported as a percentage. The N2-Score represents the extent to which post-conventional items are prioritized and the degree to which personal interest items receive lower ratings than the ratings given to post-conventional items. It includes the use of data derived from both the rating task (ie, the extent to which a participant reports that individual statements helped make a decision regarding what the protagonist in the story should do) and the ranking process (how important each statement was in helping the participant come to a decision). Scores are adjusted so that P and N2 have the same mean and standard deviation, allowing comparisons to be made.[1]

As the participant encounters an item that both makes sense and also taps into his/her preferred schema, that item is rated and ranked as highly important. Alternatively, when a participant encounters an item that either doesn't make sense or seems simplistic and unconvincing, the item receives a low rating and is passed over for the next item.[1,6] DIT2 researchers assume that rating and ranking of items across the stories can provide an index of a participant's preferred schema(s) and "represent how the participant generally approaches moral decisions beyond the DIT."[5] However, as dilemma discussion educational interventions do not always show development on the P-Score,[2,26] systematic examination of large data sets[1,7,27] investigated how schemas contribute to the overall functioning of the moral reasoning component. Clear preference for a schema (PI, MN or PC), as indicated by item rating by the respondent[1] indicates consolidation to that schema whereas a failure to discriminate between schemas is viewed as a marker of developmental disequilibrium, or "transition." Hence the terms transition (1) and consolidation (2) are used to classify respondent profiles (Table 1) and the related index is referred to as Contrans.[7,27,28]

Thoma and Rest suggested that developmental phase status might facilitate or hinder the processing of moral information, thereby moderating change associated with, for example, an educational intervention.[27] That is, participants in the consolidated status process moral information

Table 1. Developmental Profiles and Phase Index – Type Levels

Type	Schema	Contrans
1	Predominant in personal interests schema.	Consolidated (2)
2	Predominant in personal interests schema.	Transitional (1)
3	Predominant in 'maintaining norms' schema, with personal interests secondary schema.	Transitional (1)
4	Predominant in 'maintaining norms' schema.	Consolidated (2)
5	Predominant in maintaining norms schema and with the 'post-conventional schema' secondary.	Transitional (1)
6	Predominant in post-conventional schema	Transitional (1)
7	Predominant in post-conventional schema	Consolidated (2)

Adapted from Bebeau & Thoma.[5]

more readily since only a single schema predominates. In contrast, participants identified as transitional may experience more confusion since the activation of different schemas provide contrasting interpretations.

METHOD

This research used a repeated measures pre-post intervention design as a quasi-randomized, controlled, crossover study to evaluate changes in the moral reasoning scores of community pharmacists in Ireland as measured by a questionnaire form of psychometric measure known as the DIT2.[29] Ethics approval was provided by the university's research ethics committee.

Participants, all working in community pharmacy in Ireland for a minimum of three years directly prior to the study, volunteered following invitation through the pharmacy press. Participants were randomly assigned to one of two groups to engage with the 16-week educational intervention. All participants were allocated a pseudonym. The first group (G1) engaged with the educational intervention from April to August 2011 (n=16) (EI1 in Figure 1) and the second group (G2) did so between August and December 2011 (n=11) (EI2 in Figure 1).

Consistent with the crossover design, each group acted as a control to the other (C1 and C2 respectively) (Figure 1), and all participants completed the DIT2 at the three time points (April, August and December). Copies of the paper version of the DIT2 were obtained from the Center for the Study of Ethical Development (CSED) in Alabama, U.S. Data from the completed DIT2 questionnaires were scored by the CSED to provide variables for analysis. Variables included participants' summary developmental scores (P-Score and N2-Score) and phase indices (whether consolidated or in transition). Scoring of the completed DIT2 questionnaires resulted in the purging, or exclusion from the dataset, of one questionnaire completed by a participant in G2 (n=11) in April 2011. This participant was excluded from the control group and the remaining 10 members of this G2 formed the control group for G1 (Figure 1). Data was entered onto SPSS version 21 (IBM Corp., Armonk, NY).[30]

As random assignation of participants to control or experimental groups[31] is often not possible in education research, researchers may refer to quasi-experiments[29] or quasi-experimental design.[31] The use of volunteer pharmacists, who had the potential to be a biased sample of the target population[29] and whose attendance at in-person meetings could not be assured, further limited control of the process

Key: G1=Group 1; G2=group 2; EI1=time during which G1 engaged with the educational intervention (n=16); EI2=time during which G2 engaged with the educational intervention (n=11); C1=time during which G1 acted as a control for G2 (n=16); C2= time during which G2 acted as a control for G1 (n=10).
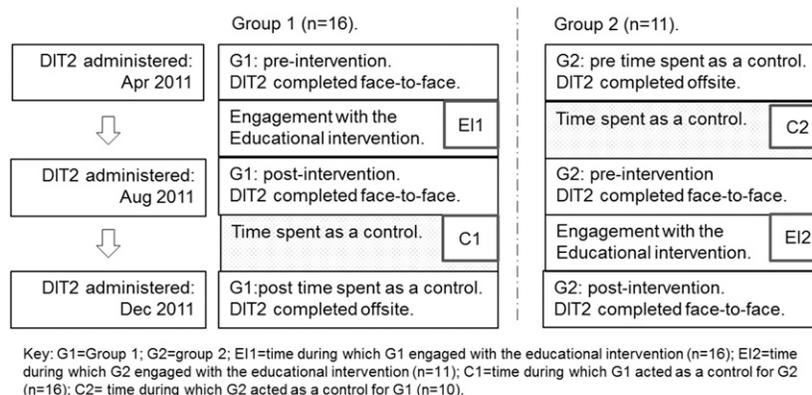
Figure 1. Engagement with the Educational Intervention: Crossover Design.

of randomization to groups. The use of a Consort flow chart[32] to record the process of participant allocation to groups in this study was included in the study design (Figure 2).

While DIT2 questionnaires for six pharmacists who did not receive the allocated intervention were scored by the CSED, the small numbers and range of potential confounds with respect to completion of the DIT2 (offsite and without any guidance) resulted in their not being included in the analysis phase (Figure 2, G2 allocation phase). Participants who did not attend both of the in-person meetings incorporated into the educational intervention design (one participant in G1 and four participants in G2) were also excluded from the analysis phase (Figure 2, follow-up phase).

Neo-Kohlbergian theory influenced the design of the educational intervention in that active learning techniques and the use of peer discussions were favored,[2,26,33,34] profession-specific dilemmas were presented in a format known to stimulate debate surrounding professional (intermediate) concepts,[10,15] and the intervention ran for 16 weeks duration.[26] A total of five profession-specific dilemma discussions, called Intermediate Concept Measures (ICMs), were included – one on each of the in-person meetings at the beginning and end of the intervention and three during the 16-week online component of the intervention (at weeks 4, 8 and 12).[35] Participants, using pseudonyms (email addresses and related identities) assigned by a gatekeeper, engaged online with the researcher and through activities (resource materials such as weblinks, PDFs, presentations, quizzes, discussion forums and chatrooms) by means of the Virtual Learning Environment (VLE). The design of the intervention accommodated
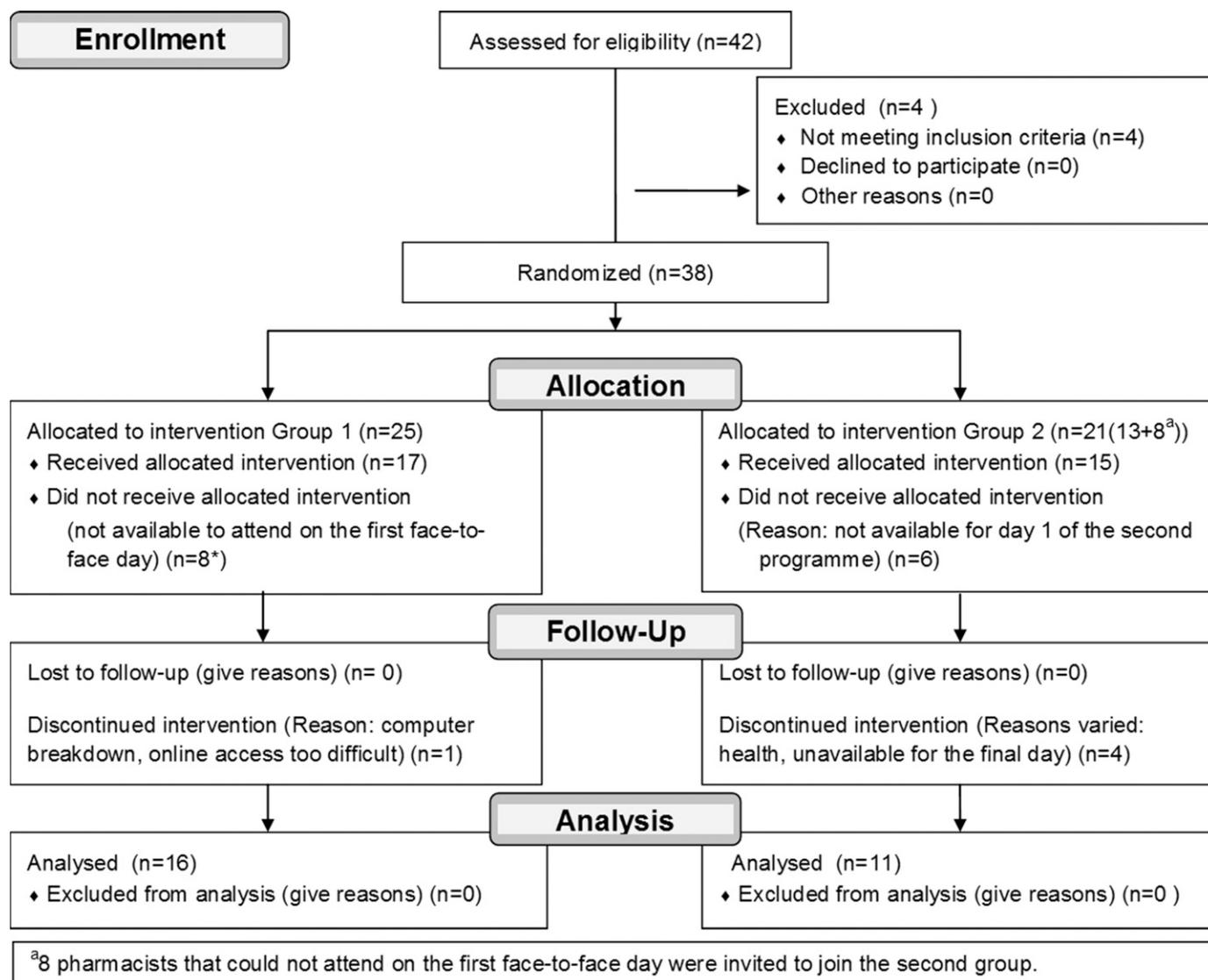

Figure 2. Enrollment in the Study and Randomization Processs: Consort 10[32] Flowchart.

participant completion of the DIT2, as identified by their pseudonyms, when face-to-face at the beginning and end of the intervention and by means of mail when acting as a control. Repeated measurements were made on the same individuals and analysis could take account of correlation with respect to the impact of the intervention on those individuals.[29] The addition of a crossover element facilitated that participants served as their own controls, thus reducing sample size demands.[29,31] However, as engagement with the educational intervention was likely to be developmental,[1] a carry-over effect following completion of engagement with the intervention could not be ruled out and was accepted as a potential confound.

Relationships among summary developmental scores, P-Score and N2-Score, prior to the intervention, changes in these variables during engagement with the intervention and measures of the same variables pre- and post-control period were analyzed. Phase changes, ie, whether consolidated or in transition pre- and post-engagement with the educational intervention, were of particular interest. To investigate interaction effects between changes in developmental scores and developmental phase, four groups were formed to represent participants' developmental phase pre- and post-educational intervention: Consolidated both pre and post (C-C), In Transition pre and Consolidated post (T-C), Consolidated pre and In Transition post (C-T) and In Transition pre and post (T-T) (Figure 3).

Appropriate normality testing was included in the analysis (ie, tests for symmetry, skewness and kurtosis preceded the final decision as to the range of statistical tests that would be used).[29] Skew and kurtosis were determined for the combined group G1&2, and for G1 and G2 independently, for relevant variables. Consideration

was also given to whether violations in data, even if they did occur, would bias the effect of the study, (eg, only a strong skewness would have the potential to bias the effect).[29] To acknowledge the relatively large standard deviations aligned with the DIT2, tests for sphericity (Levene's test) were used where appropriate.[29,31] Given that the crossover design of the study resulted in two groups, Chi-square was used to test for association of key categorical variables between groups. Categories were suitably collapsed, and where one cell in the cross-tabulation contained fewer than five cases, Fisher's Exact Test was also determined.

T-tests (one-tailed, independent and paired) produced a test statistic that indicated whether there was a difference between means: as the DIT2 had not been independently validated in the Irish community pharmacy setting, one-tailed t-tests were used to compare means of US Norms (baseline) data[36] with the study sample; independent t-tests supported the comparison of groups, and paired t-tests aligned with the repeated measures crossover study design (Figure 1).

P-values were reported for each of the test statistics. While $p < .05$ was deemed to be significant for the purposes of reporting, $.05 < p < .10$ indicating statistical tendencies, was also reported.[29] Each statistic was presented with its standard deviation (SD).[37] Because "p values are affected by the size of the treatment effects as well as the size of the sample"[29] measures of magnitude of the practical significance of research results, ie, measures of strengths of association and measures of effect size (typically standardized mean differences), were included in the analysis. Cohen's d, an objective measure of the magnitude of an observed effect, was reported, with the guideline that the t-test threshold for a large effect is $d = .8$, for
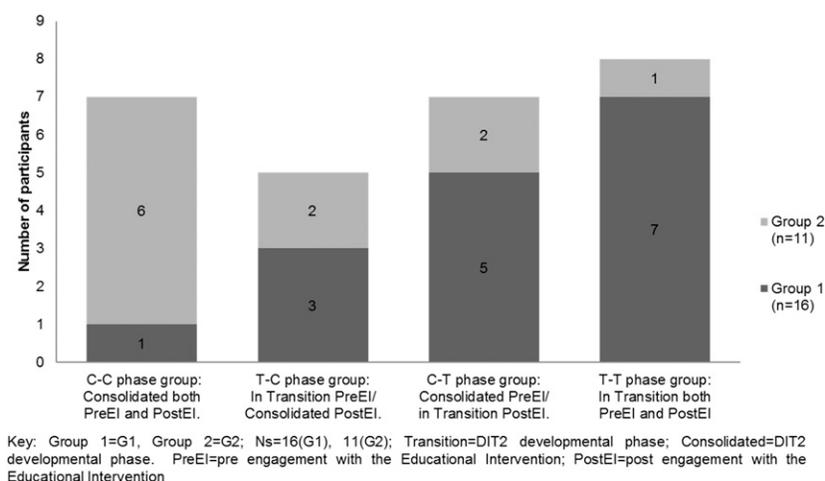

Figure 3. Participant Developmental Phase (contrans) Pre- and Post-Educational Intervention.

a medium effect is $d=.5$ and for a small effect is $d=.2$.[38] Interactions between different aspects of the results, eg, the strength of association between the independent and dependent variables, and interactions between developmental scores and grouping variables, were investigated using ANOVA. As the test provided an F-statistic that compared systematic (related to the intervention) and unsystematic variance,[29] a large value of F was unlikely to occur if the intervention had no effect in the study group (s). Effect sizes reported for ANOVA, referred to as eta-squared or partial eta-squared, were that a large effect is $\eta^2=.26$, for a medium effect is $\eta^2=.13$ and for a small effect is $\eta^2=.02$.[29,31] As there was only one predictor in the case of analysis for this study, eta-squared and partial eta-squared, as determined using SPSS,[30] were the same. The report followed American Psychological Association guidelines for reporting statistics.[37]

RESULTS

Changes in summary developmental scores, P-Score and N2-Score, during engagement with the intervention indicated that the educational intervention affected the moral reasoning competencies development of community pharmacists in Ireland, as measured by the DIT2. In addition, interaction effects were observed between developmental scores on the DIT2 and phase changes ie, whether or not participants were determined to be consolidated in their reasoning pre- and post-engagement with the educational intervention.

Two issues informed this analysis: whether the current sample was representative of the population of Irish community pharmacists, and whether the current sample differed from U.S. norms for professionals. Regarding the first issue, females (n=20) in the study group ranged in age from 28 to 54 years (mean=38.4 years, SD=7.1 years) and males (n=7) ranged from 33 years to 60 years (mean=46.6 years, SD=10.5 years). Age distribution, ie,

values of skewness and kurtosis, was determined to be acceptably normal. While age ranges of participants were higher than on the PSI register, resulting from an over-representation of 35- to 45-year-olds in the group, and the sample had more females (74%, by comparison with 62% of the 4,793 pharmacists registered with the PSI), the sample was acceptably representative of community pharmacists in Ireland during 2011.[19,20] Regarding the second issue, comparison with the international database held at the CSED[36] indicated that scores for community pharmacists in Ireland were comparable with the database (Table 2), including when grouped according to gender (Table 3).

Comparisons prior to the educational intervention exposed pre-existing differences between the two groups. To help guide subsequent analyses, the authors considered whether the two groups differed in meaningful ways or if they could be combined. Analyses of the data presented in Table 4 indicate that the two groups were different on the summary developmental scores prior to engagement with the educational intervention and the effect sizes were moderate to large. Since the summary scores represent developmental variables, the authors considered whether the observed differences could be attributed to age differences between groups. This explanation for the pre-existing differences between groups was not supported [t (25)=.80, p>.05, d=.26].

When it comes to whether the educational intervention affected the development of moral reasoning competencies of community pharmacists in Ireland, the finding that there may have been a difference between the two groups, with respect to baseline values of key developmental scores, prompted continued analysis of the two groups jointly and as separate groups.

The authors first considered whether there was naturally occurring change on the developmental scores during the time spent pre- or post-intervention (eg, when the

Table 2. Participant Summary Developmental Scores Compared With US Norms Scores[37]

Index	US Norms Mean (SD)	Pre-EI Mean (SD)	*t*-statistic	*p* value	Effect size *d*
G1&2 (age: mean=40.6 years; SD=8.8 years)					
N2-Score	41.33 (14.57)	39.23 (18.96)	0.57	.57	.12
P-Score	41.06 (15.22)	41.15 (18.44)	-0.03	.98	.01
G1 Pre-EI (age: mean=39.5 years; SD=7.5 years)					
N2-Score	41.33 (14.57)	33.79 (17.86)	1.69	.11	.46
P-Score	41.06 (15.22)	35.20 (16.14)	1.45	.17	.37
G2 Pre-EI (age: mean=42.3 years; SD=10.7 years)					
N2-Score	41.33 (14.57)	47.15 (18.44)	1.05	.32	.35
P-Score	41.06 (15.22)	49.82 (18.81)	-1.54	.15	.51

Key: Ns=15,494 (Baseline for N2-Score), 15,496 (Baseline for P-Score); 27 (G1&2), 16 (G1), 11 (G2);
Pre-EI=pre-engagement with the educational intervention; US Norms=reference to baseline by Dong;[37]
N2=DIT2 N2-Score, P=DIT2 P-Score; *d*=Cohen's d statistic, standard deviations are in parentheses

Table 3. Male and Female N2-Scores and P-Scores, Combined G1 & G2, Compared With US Norms (Baseline) Scores[37]

Index	Gender	US Norms Mean (SD)	Pre-EI Mean (SD)	*t*-statistic	*p* value	Effect size *d*
N2-Score	Male	39.79 (14.43)	35.57 (15.39)	0.73	.50	.28
	Female	42.75 (15.57)	40.52 (20.26)	0.49	.63	.12
P-Score	Male	39.12 (14.97)	35.71 (11.34)	0.80	.46	.26
	Female	42.82 (15.24)	43.06 (20.25)	-0.05	.96	.01

Key: Ns=7,348 (Baseline Male), 7 (Male Pre-EI), 8,031 (Baseline Female), 20 (Female Pre-EI); N2=DIT2 N2-Score, P=DIT2 P-Score; Pre-EI=pre-engagement with the educational intervention; US Norms=reference to baseline by Dong;[37] *d*=Cohen's d statistic, standard deviations are in parentheses

groups were serving as controls). Importantly, and consistent with prior studies,[26] no statistically significant change was observed in the absence of the intervention (Table 5).

By contrast, differences between the pre-post N2-Score and P-Score for G2 were found to be significant at the $p<.05$ level following the intervention (Table 6).

Effect sizes were small to moderate (N2-Score $d=.29$ and P-Score $d=.40$) indicating that these were findings of importance. Although in the expected direction, the change observed for G1 did not reach statistical significance (Table 6). However, when G1 and G2 were combined, the group differences were statistically significant at the $p<.10$ level suggesting a statistical tendency [t (26)=1.72, $p<.10$, $d=.23$].

Given the differences in experimental findings by group, the authors considered whether additional developmental indicators might clarify the findings. When organized by developmental phase pre- and post-educational intervention (Figure 3), differences by intervention group were found [χ^2 (3, $n=27$) = 8.94, $p<.05$]. G1 was categorized by a higher number of participants in transitional status and who remained in transitional status across the interventions. G2 participants, by contrast, were mostly associated with the consolidated status (Figure 3). Given the differences found in the developmental phase, the authors tested whether developmental phase change status was related to different rates of growth during the intervention. Consistent with the view that the rate of change is related to developmental phase grouping, interaction effects (by phase

group) were found to be highly significant for both N2-Scores [F(1,23)=8.46, $p<.001$, $\eta^2=.525$] and for P-Scores [F(1,23)=7.58, $p<.01$, $\eta2=.497$]. The effect sizes were large.

Interpreting these interactions (Table 7) revealed that there were larger average variations in both N2-Score and P-Score pre-post engagement with the educational intervention for the T-C group than for the other three groups (C-C, C-T and T-T). Pairwise comparisons indicated that the two groups that changed status (T-C and C-T) accounted for the interaction, or moderating, effects. The group that began in transition and for whom status did not change during engagement with the educational intervention (T-T) showed a very small decrease in N2-Score and a very small increase in P-Score.

Given that the interaction was found to be highly significant, and that the T-C group accounted for most of the interaction (Table 7), characteristics of each of the T-C group and the rest of the participants were compared (Table 8).

While there were proportionally more males and the average age was close to four years older, relationships between the T-C group and all other participants were not found to be significant – whether Chi-square or Fisher's exact test was employed.

DISCUSSION

This is the first reported pre-post crossover study examining the impact of a profession-specific educational

Table 4. Comparison Between G1 and G2 Developmental Scores Pre-engagement With the Educational Intervention

Index	G1 Pre-EI Mean (SD); n=16	G2 Pre-EI Mean (SD); n=11	*t*-statistic	*p* value	Effect size *d*
N2-Score	33.79 (17.86)	47.15 (18.44)	1.89^	.07	.73
P-Score	35.20 (16.14)	49.82 (18.81)	2.16*	.04	.83
Index	**G1 Pre-EI Mean (SD); n=16**	**G2 Pre-Cn Mean (SD); n=10**	**t-statistic**	**p value**	**Effect size d**
N2-Score	33.79 (17.86)	45.17 (18.44)	1.56	.13	0.63
P-Score	35.20 (16.14)	49.48 (18.07)	2.10*	.05[a]	.83

Key: Ns=16 (G1 Pre-EI), 11 (G2 Pre-EI), 10 (G2 Pre-Cn); *$p<.05$; ^=.10>p>.05; N2=DIT2 N2-Score, P=DIT2 P-Score; Pre-EI=pre-engagement with the educational intervention; Pre-Cn=pre-engagement in a control group; Baseline=reference to Dong;[37] *d*=Cohen's d statistic, standard deviations are in parentheses
[a]asterisk assigned to t-statistic as $p=.047$

Table 5. Participant Preferences for Developmental Schemas P-Score and N2-Score Pre- (Pre-Cn) and Post-time Spent as a Control (Post-Cn)

Index	Pre-Cn Mean (SD)	Post-Cn Mean (SD)	*t*-statistic	*p* value	Effect size *d*
Group 1 & 2 (n=26)					
N2-Score	38.64 (17.46)	40.56 (18.94)	0.82	.42	.11
P-Score	42.09 (16.73)	42.38 (18.82)	0.11	.91	.02
Group 1 (n=16)					
N2-Score	34.56 (16.05)	36.59 (18.12)	0.65	.52	.12
P-Score	37.47 (14.54)	38.13 (17.52)	0.19	.85	.04
Group 2 (n=10[a])					
N2-Score	45.17 (18.44)	46.91 (19.42)	0.47	.65	.09
P-Score	49.48 (18.07)	49.20 (19.71)	-0.06	.95	-.01

Key: Ns=26 (G1&2), 16 (G1), 10 (G2); N2=DIT N2-Score, P=DIT P-Score; Pre-Cn=pre-engagement in a control group; Post-Cn=post-engagement in a control group; *d*=Cohen's d statistic, standard deviations are in parentheses
[a]One DIT2 score purged

intervention on the development of moral reasoning competencies in community pharmacists, as measured by the DIT2. The study provides solid findings related to the impact of an educational intervention, most notably that there was a positive impact on the summary developmental scores (N2-Score and P-Score) following engagement with the educational intervention, and that interactions between developmental phase indices (Contrans) changes and N2-Scores and P-Scores during engagement with the educational intervention were observed. The findings support other studies related to profession-specific educational interventions which affected the development of individuals' moral reasoning competencies.[1,2,10,16,26] The impact of such interventions can be moderated by whether participants can discriminate between the personal interest, maintaining norms and post-conventional schemas when deciding through dilemma scenarios.[27,28]

These findings were set in context by confirmation that the sample of community pharmacists recruited to the study was determined to be representative of the database

held at the CSED,[36] thereby facilitating appropriate comparisons with other studies; the sample of community pharmacists recruited to the study was determined to be acceptably representative of the register of pharmacists in Ireland[19,20] in terms of gender and age, and changes in summary developmental scores determined for participants pre-post time spent as a control were not found to be significant, thereby supporting a claim that changes observed in the study were likely to have been a result of engagement with the educational intervention.[29,31]

Neo-Kohlbergian theory predicts that paired t-tests of measures of post-conventional reasoning on the DIT, pre- and post-educational intervention that has been designed to impact on moral reasoning competencies development, will be statistically significant.[1] Findings from this study, where G2 N2-Scores and P-Scores were found to be significant, supported that prediction (Table 6).

The actual increases in mean N2-Score for G1&2 (2.55 points) and G2 (5.15 points) and in mean P-Score for G1&2 (4.16 points), G1 (2.27 points) and G2 (6.91

Table 6. Participant Preferences for Developmental Schemas P-Score and N2-Score Pre- (Pre-EI) and Post- (Post-EI) engagement With the Educational Intervention

Index	Pre-EI Mean (SD)	Post-EI Mean (SD)	t-statistic	*p* value	Effect size *d*
G1 & 2					
N2-Score	39.23 (18.96)	41.78 (18.19)	1.21	.24	.14
P-Score	41.15 (18.44)	45.31 (17.70)	1.72^	.05	.23
G1					
N2-Score	33.79 (17.86)	34.56 (16.05)	0.24	.81	.05
P-Score	35.20 (16.14)	37.47 (14.54)	0.61	.55	.15
G2					
N2-Score	47.15 (18.44)	52.29 (16.40)	2.30*	.04	.29
P-Score	49.82 (18.81)	56.73 (16.01)	2.86*	.02	.40

Key: Ns=16 (G1), 11 (G2); N2=DIT2 N2-Score, P=DIT2 P-Score; Pre-EI=pre-engagement with the educational intervention, Post-EI=post-engagement with the educational intervention; *$p<.05$; ^=.10>p>.05; *d*=Cohen's d statistic, standard deviations are in parentheses
[a]asterisk assigned to t-statistic as $p=.097$

Table 7. N2-Scores and P-Scores, Pre- and Post-Educational Intervention, Grouped by Participant Developmental Phase Status Changes During Engagement With the Intervention

Index	Contrans change	Age in Years Mean (SD)	Pre-EI Mean (SD)	Post-EI Mean (SD)
N2-Score	C-C (pre-post EI)	38.5 (7.7)[a]	58.67 (12.56)	59.90 (10.22)
	T-C (pre-post EI)	43.6 (11.3)	36.70 (7.58)	50.36 (9.45)
	C-T (pre-post EI)	40.3 (8.7)	36.11 (18.18)	35.78 (13.43)
	T-T (pre-post EI)	40.5 (9.1)	26.55 (17.55)	25.83 (15.04)
P-Score	C-C (pre-post EI)	38.5 (7.7)[a]	60.57 (14.91)	62.29 (12.72)
	T-C (pre-post EI)	43.6 (11.3)	37.60 (5.73)	52.80 (10.64)
	C-T (pre-post EI)	40.3 (8.7)	35.43 (14.68)	38.86 (11.99)
	T-T (pre-post EI)	40.5 (9.1)	31.39 (18.47)	31.44 (15.74)

[a]n=6, as one participant declined to give age
Key: N2=DIT2 N2-Score, P=DIT2 P-Score; C=Consolidated, T=Transition; Ns=7(C-C), 5(T-C), 7(C-T), 8(T-T); Pre-EI=pre-engagement with the educational intervention, Post-EI=post-engagement with the educational intervention; standard deviations are in parentheses

points) compare favorably with reports of short interventions that affected the moral reasoning of undergraduate students as measured by the DIT: Swisher and colleagues[39] reported an N2-Score increase of 3.5 points following a six-week ethics course with undergraduate physical therapy students, Jones[40] reported a P-Score increase of 5.49 points following a three-week ethics course with undergraduate business students, and Latif[33] reported a P-Score increase of 2.5 points following a semester-long program with second year pharmacy students. It is important to consider also that while tests of statistical significance are the cornerstone of the quantitative positivist approach utilized in this study,[29] the developmental focus means that "even small gains on these measures...are of theoretical and practical interest,"[26] indicating that smaller increases in summary developmental scores may also be important findings.

The index of consolidation and transition (Contrans) captures aspects of moral reasoning development not directly assessed by consideration of the summary developmental scores.[6] Bailey and colleagues reinforce that "programmes of study or professional experience may have an independent effect" on developmental phase indices and these should therefore be assessed by researchers.[16]

During consolidation, an individual will experience increased clarity in the preferred moral reasoning schema ie, that particular schema is integrated to his/her information processing and readily recognized.[6,28] The result is that the individual depends less "on environmental cues in the activation and articulation of the moral [reasoning] schema"[28] and is more likely to be effectively self-regulated and self-informed in his/her moral reasoning. In contrast, an individual in transition is likely to struggle in situations where he/she must process conflicting information, especially when there is limited time available for activating a relevant moral reasoning process.[27,28] Decision-making within strict time-constraints is common for community pharmacists.[3,13,14,21,23]

Participant developmental phase changed for 12 (44%) of the participants during engagement with the educational intervention (Figure 3). The impact of the intervention concluded that the proportion of G1 participants in transition post-intervention increased to 75%, whereas the proportion of G2 participants in transition post-intervention decreased to 27% (Figure 3).

Movement into transitional statuses, as was observed for G1 participants as they engaged with the educational intervention, has the potential to lead to "increased moral

Table 8. Comparison of Demographics: (T-C) Compared With (T-T + C-T + C-C)

Variable	Identifier	T-C (n=5)	T-T+C-T+C-C (n=22)	Total (n=27)
Group	G1	2	14	16
	G2	3	8	11
Demographics				
Sex	Male	2	5	7
	Female	3	17	20
Age in years		43.6 (11.3)	39.9 (8.2)	40.6 (8.8)

Key: Ns=5 (T-C), 22 (T-T + C-T + C-C); C=Consolidated, T=Transition; T-C=in transition pre-engagement with the educational intervention and consolidated post-intervention; standard deviations are in parentheses

confusion."[6,28] The findings for phase changes for G1 participants therefore represent a pattern associated with little growth on the DIT2.[6,27] This is consistent with the finding that changes for post-conventional reasoning scores for G1 participants were found to be not significant (Table 6).

Individuals at different developmental phases were a part of the study ie, their normative growth was picked up by the DIT2 completed pre-engagement with the educational intervention (Figure 3). Findings indicated that the impact of the intervention on summary developmental scores varied for participants who were associated with different developmental phase status changes, ie, whether consolidated (C) or in transition (T) pre- and post-engagement with the educational intervention (Table 7). Changes in participant N2-Scores and P-Scores supported the expectation that participants' DIT2 scores change at different rates based on current developmental phase.[6,16,27] The T-C group showed the most pre- to post-change whereas the group that began in transition and for whom status did not change during engagement with the educational intervention (T-T) showed a very small decrease in N2-Score and a very small increase in P-Score (Table 7).

These findings aligned with research that found that those who moved from transition to consolidation "changed at a faster rate than all other patterns."[6] The proposal is that transition may be a state that is potentially ripe for change[6,27] whereas a consolidated perspective is more difficult to reach. This helped explain the comparatively large increase in summary developmental scores for the group that changed from being in transition to (being) consolidated (T-C) following engagement with the educational intervention (Table 7).

However it is not possible to state whether the intervention itself led to the increased N2-Scores and P-Scores or that the intervention led to the change (from transition to consolidated status) and the consolidated status then clarified a participant's responses to the DIT2 post-engagement with the educational intervention.[27,28] In addition, it remains unclear why some of those that began in transition moved to a consolidated phase during the educational intervention (Table 7), but others remained in transition and did not significantly improve summary developmental scores ie, the group that began in transition and remained in transition (T-T) was not affected by the educational intervention to the extent that might have been expected by an underpinning theory that anticipates transition is a status ripe for change. It is possible that the design and/or delivery of the educational intervention disadvantaged some of the participants who were in transition pre-engagement with the educational intervention or, that some participants

were more prepared for change than others or, indeed, that some participants in transition engaged in a more interactive manner than others. It is also possible that participants who moved from consolidated status to being in transition may have been starting development that would be found to be significant over time, whereas those who began and ended in a consolidated status, especially where they were Type 7 (Table 1), may have found the intervention less challenging or that it confirmed their perspective.

The general rule of thumb, in correlational research, is that a minimum of 30 participants is desirable.[29,31,41] The sample size (n=27) therefore had the potential to bias against findings.[29] In addition, the small sample size limited a more fine-grained analysis of the secondary variables and some categories required to be collapsed to ensure adequate sizes of sub-groups during analysis. Limitations with respect to generalizability include that the sample was confined to community pharmacists working in Ireland, therefore, study findings might not apply to pharmacists in Ireland working in different contexts, such as hospital pharmacy or to pharmacists in other jurisdictions, and the volunteer status of pharmacists recruited may limit the potential to claim generalizability of findings to all pharmacists.

CONCLUSION

The result of this study is that pharmacies and pharmacists have access to a tool (DIT2), validated for the measurement of moral reasoning, that has been demonstrated as being applicable to the context of community pharmacists in Ireland. Researchers have evidence that the DIT2 has been used as a pre-post measure of the impact of an educational intervention engaged by community pharmacists in Ireland; results from studies completed with community pharmacists in Ireland have the potential to be compared with other studies that used the DIT2; the prediction that phase changes interact with, or moderate, developmental indices have been observed with community pharmacists, and a 16-week profession-specific educational intervention that required minimal in-person contact time and incorporated five pharmacy-specific ICMs had a positive effect on moral reasoning competency development in community pharmacists in Ireland. While more studies with a larger study population are recommended to support all of these conclusions, the findings nonetheless contribute to the body of existing knowledge concerning moral reasoning competencies assessment and development, and the impact that a profession-specific educational intervention might have on those competencies.

In addition to the findings at the summary score level, the current study supports further attention on the

developmental phase variable. It would be particularly useful to assess how interventions influence individuals who differ by developmental phases. For instance, interventions may be more effective if attention is given to the potential confusion associated with the transitional status. Similarly, this study supports interventions designed to encourage participants to critically evaluate their consolidated moral perspectives as a prerequisite for future structural change. Taken together, the current study indicates that moral competencies can be enhanced through exposure to a modest but theoretically framed intervention. Additionally, the findings indicate alternative ways in which an intervention might influence participants. By including the developmental phase information, this study presents a more nuanced description of educational interventions in which engagement with the intervention interacts with current moral functioning in predictable ways. Future studies, in community pharmacy and other practice settings, with pharmacy students at various stages of their professional development, and in the professions more generally, can benefit from the methods and findings outlined above.

ACKNOWLEDGMENTS

REFERENCES

1. Rest J, Narvaez D, Bebeau MJ, Thoma SJ. *Postconventional Moral Thinking: A Neo-Kohlbergian Approach*. Mahwah, NJ: Lawrence Erlbaum Assoc. 1999.

2. Rest JR, Narvaez D. *Moral Development in the Professions: Psychology and Applied Ethics*. Hillsdale, NJ: Lawrence Erlbaum Assoc. 1994.

3. Latif DA, Berger BA, Harris SG, Barker KN, Felkey BG, Pearson RE. The relationship between community pharmacists' moral reasoning and components of clinical performance. *J Soc & Adm Pharm*. 1998;15(3):210-224.

4. Putnam Cole A, Block L, Wu AW. On higher ground: ethical reasoning and its relationship with error disclosure. *BMJ Quality & Safety*. 2013;22:580-585.

5. Thoma SJ, Dong Y. The defining issues test of moral judgment development. *Behav Devel Bulletin*. 2014;19(3):55-61.

6. Thoma SJ. Research on the defining issues test. In: M. Killen & J. G. Smetana (eds.), *Handbook of Moral Development*. Mahwah, NJ: Lawrence Erlbaum Assoc.; 2006:67-92.

7. Bebeau MJ, Thoma SJ. *A Guide for Using the Defining Issues Test, Version 2 (DIT-2) and the Scoring Service of the Center for the Study of Ethical Development*. Tuscaloosa, AL: Center for the Study of Ethical Development; 2003.

8. Latif DA. The relationship between pharmacists' tenure in the community setting and moral reasoning. *J Bus Ethics*. 2001;31(2):131-141.

9. Latif DA, Berger BA. Moral reasoning in pharmacy students and community practitioners. *J Soc & Adm Pharm*. 1997;14(3):166-179.

10. Bebeau MJ, Monson VE. Guided by theory, grounded in evidence: a way forward for professional ethics education. In: L. Nucci and D. Narvaez (eds.), *Handbook on Moral and Character Education*. New York, NY: Routledge; 2008:557-582.

11. Kohlberg L, Hersch RH. Moral development: a review of the theory. *Theory Into Pract*. 1977;16(2):53-59.

12. Narvaez D, Bock T. Moral schemas and tacit judgement or how the Defining Issues Test is supported by cognitive science. *J Moral Educ*. 2002;31(3):297-314.

13. Roche C, Kelliher F. Giving "best advice": proposing a framework of community pharmacist professional judgment formation. *Pharmacy*. 2014;2(1):74-85.

14. Roche C, Kelliher F. Exploring the patient consent process in community pharmacy practice. *J Bus Ethics*. 2009;86(1):90-99.

15. Roche C, Thoma S, Wingfield J. From workshop to e-learning: using technology-enhanced "Intermediate Concept Measures" as a framework for pharmacy ethics education and assessment. *Pharmacy.* 2014;2(2):137-160.

16. Bailey CD, Scott I, Thoma SJ. Revitalising accounting ethics research in the Neo-Kohlbergian framework: putting the DIT into perspective. *Behavl Research in Acct*. 2010;22(2):1-26.

17. Pharmacy Act. Number 20. 2007. www.irishstatutebook.ie. Accessed March 22, 2016.

18. CoC - Code of Conduct for Pharmacists. Pharmaceutical Society of Ireland, Dublin. 2009. www.thepsi.ie. Accessed March 22, 2016.

19. Horwath Bastow Charleton. Baseline study of Community Pharmacy Practice in Ireland. Report commissioned by the Pharmaceutical Society of Ireland. Pharmaceutical Society of Ireland, Dublin. 2011. www.thepsi.ie. Accessed March 22, 2016.

20. PSI - Pharmaceutical Society of Ireland. Statistics 2011. www.psi.ie.

21. Cooper RJ, Bissell P, Wingfield J. 'Islands' and 'doctor's tool': the ethical significance of isolation and subordination in UK community pharmacy. *Health (London)*. 2009;13(3):297-316.

22. Schlesselman LS. A cross-sectional study of applied bioethical reasoning in pharmacy students and preceptors. *Pharm Pract (Granada)*. 2014;12(2):401.

23. Mestrovic A, Stanicic Z, Hadziabdic MO, et al. Individualized education and competency development of Croatian community pharmacists using the general level framework. *Am J Pharm Educ*. 2012;76(2):Article 23.

24. Roche C. Ethical and legal issues in healthcare: 'link selling' – maintaining professional integrity and meeting patient needs. *Irish Pharm J.* 2009;87(8-10):122-123.

25. Wingfield J, Badcott D. *Pharmacy Ethics and Decision Making*. London, UK: Pharmac Press; 2007.

26. Schlaefli A, Rest JR, Thoma SJ. Does moral education improve moral judgment? A meta-analysis of intervention studies using the Defining Issues Test. *Rev Educ Res.* 1985;55(3):319-352.

27. Thoma S, Rest J. The relationship between moral decision making and patterns of consolidation and transition in moral judgment development. *Dev Psychol.* 1999;35(2):323-333.

28. Derryberry WP, Thoma SJ. Functional differences: comparing moral judgement developmental phases of consolidation and transition. *J Moral Educ.* 2005;34(1):89-106.

29. Kirk RE. *Experimental Design: Procedures for the Behavioural Sciences*. 4th Ed. US. Sage; 2013.

30. IBM Corp. IBM SPSS Statistics for Windows, Version 21.0. 2012. Armonk, NY: IBM Corp.

31. Cohen L, Mannion L, Morrison K. *Research Methods in Education*. 6th Ed. New York, NY: Routledge; 2007.

32. Consort 10. Flow Diagram. 2010. www.consort-statement.org. Accessed March 22, 2016.

33. Latif DA. The relationship between ethical dilemma discussion and moral development. *Am J Pharm Educ*. 2000;64:126-133.

34. Penn WY. Teaching ethics – a direct approach. *J Moral Educ*. 1990;19(2):124-138.

35. Roche C, Thoma SJ, Grimes T, Radomski M. Promoting peer debate in pursuit of moral reasoning competencies development: spotlight on educational intervention design. *Innovations in Pharmacy*. 2017;8(4):Article 2.

36. Dong Y. Norms for DIT2: from 2005-2009. 2011. Center for the Study of Ethical Development. http://ethicaldevelopment.ua.edu/. Accessed March 22, 2016.

37. *Publication Manual of the American Psychological Association*. 6th Ed. Washington, DC: APA – American Psychological Association; 2010.

38. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. 2nd Ed. Hillsdale, NJ: Lawrence Erlbaum Assoc.; 1988.

39. Swisher LL, van Kessel G, Jones M, Beckstead J, Edwards I. Evaluating moral reasoning outcomes in physical therapy ethics education: stage, schema, phase and type. *Phys Therapy Rev*. 2012;17 (3):167-175.

40. Jones DA. A novel approach to business ethics training: improved moral reasoning in just a few weeks. *J Bus Ethics*. 2008;88 (2):367-379.

41. Tavakol M, Sandars J. Quantitative and qualitative methods in medical education research: AMEE Guide No. 90: Part I. *Med Teach*. 2014;36(9):746-756.