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Review Article

Lecture and discussion methods as predictors of knowledge building by students Nazmi Xhomara

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Abstract

The purpose of the study is to investigate the influence of lecture and discussion methods on Knowledge Building. Both structured questionnaire and semi-structured interviews were used in the study. A random cluster sample of students (N = 145) as well as a significant sample of lectures (N = 61) were selected. A low positive correlation exists between the lecture method and Knowledge Building (r = .076), where the total variance of Knowledge Building levels following Lecture method techniques was 0.9%. At the same time, a relatively low positive correlation is exhibited between Discussion method and Knowledge Building (r = .283), where the total variance of Knowledge Building levels following Discussion method techniques was 6.4%.

Keywords: Lecture method, Discussion method, Knowledge Building.

Introduction

Lecture and discussion are purported to be the prevalent methods in teaching, and two variables that significantly influence Knowledge Building, especially in higher education. The research is focused on the impact of the lecture and discussion methods on Knowledge Building. Many authors have referred to the influence of these two teaching methods upon Knowledge Building. The word *lecture* comes from a 14th century Latin word *lectus*, which roughly translates as "to read". While the Lecture method offers advantages such as teacher control, new material, and less effort, there are disadvantages as well, such as one-way- professors, passive, strong speaker expectations (Paris, 2014). A class can be likened to a small society (Durkheim, 1956), where there is a mutual overexcitement that lecturer must manage in order to support Knowledge Building. At the same time, discussion methods, according to Wilkinson (2009), provide a variety of forums for open-ended, collaborative exchanges of ideas among teachers and students for furthering their thinking, learning, and problem-solving.

Traditional teaching as well as new, interactive approaches influence knowledge and experiences differently (Borges & Mello-Carpes, 2015; Candace, Maria, & Magda, 1997). Among the responsibilities of schooling are building the knowledge and skills of their students (Mercer (2016), including reading which can greatly impact Knowledge Building (Fisher, Ross & Grant, 2010). Presented with real-life situations promotes an uptake of discussions within the learning environment; conversely, lower prevalences of such environments are associated with a higher likelihood of teachers leaving the profession (Bettmann, 2016; Arnup & Terence, 2016). Up to now, researchers have found that interactive teaching encourages Knowledge Building. Consequently, the study of the lecture and discussion methods on Knowledge Building contributes substantially to how and what is taught and learned. Questions hypothesized for the basis of this research study include: (a) How much of the variance in Knowledge Building can be attributed to the Lecture method? (b) How much of the variance in Knowledge Building can be attributed to the Discussion method? The objective of the study is to ascertain the influence the Lecture and Discussion methods have on Knowledge Building.

Literature Review

The Lecture method

The Lecture method seemed to be the long-standing stancard and the most prevalent teaching method in universities. Although the pedagogical value of the lecture (Laing, 1996) continues to be questioned, it is likely that lecturing will continue to be the dominant teaching method at the university level, supplemented with the integration of questions, pro and con grids, debates, guided analyses, case studies, field trips, role playing, one-minute papers and, ungraded quizzes (CTE, 2016). Further to Laing (1996), although the pedagogical value of the lecture continues to come under scrutiny, it remains the leading method for teaching and delivering course material to large groups.

There are advantages of the lecture method, as for exposing students to unpublished material, lecturer precisely determines the content and organization, arouse interest, complements text material and learning preferences, facilitates large-class communication. There are disadvantages too, as the passive role of students, hinders learning, encourages one-way communication, requires an unguided student time outside of the classroom to enable understanding of content, requires the instructor to have effective writing and speaking skills (CIRTL, 2016).

The student lecture model primarily encompasses atmosphere, structure and clarity, learning content, levity, relationship with the students, interesting breaks, relevant examples, and a motivating delivery to the students; inclusion of teacher leadership adds favorably to the school learning environment (Waugh & Waugh, 1999; Sebastian, Allensworth & Huang, 2016).

Better disciplinary order coupled with stronger school attachment, and components of the F4 model – lecture design of feedback, fixation, formative assessment and fun within the lecture – not only results in increased participation and student engagement but also a decreases the likelihood of dropping out (Pickford & Clothier, 2006; Kotok et al., 2016). As a consequence, the different authors continue to advocate the use of the lecture method in teaching and learning in universities, and vital to Knowledge Building.

The Discussion method

The Discussion method seemed to be the most effective teaching method in universities. Roby (1988, cited by Wilkinson, 2009) classifies types of discussions whether the teacher or students, or both, have interpretive authority; problematical, dialectical, informational, quiz shows, and bull sessions. The discussion method engages students with questions and dialogue and sharpens their powers of reason, as well as permits students to be active in their learning, and the learning is more effective (TACC, 2016; Cashin, 2011; Shahida, 2001).

A problem, an issue, a situation in which there is a difference of opinion, is suitable for discussion method of teaching, and discussion is a method of leading a discussion in which authority and control remain in the hands of the discussion leader (Kochhar, 2000, p. 347; Welty, 1989). To construct an effective discussion, include the purpose of discussion, plan each session, discuss expectations, explain the rules for participation, help students prepare for the discussion, and avoid faulty assumptions students hold about discussions. (Davis, 1993; Davis, 2009, p. 107).

Every function in the child- cultural development appears twice: first on the social level, and later, on the individual level: first between people, and then inside the child (Vygotsky, 1978). The discussion method in distinguished by some of its' main characteristics such as: experiential learning, emphasis on students, focus on critical thinking and, use of questions (Cooper & Simonds, 1995).

Discussion approaches are effective at increasing student involvement and active learning, in developing students' thinking skills and higher-level learning such as application, analysis, synthesis, and evaluation (Lowman, 1995; Bloom et al., 1956), and creativity (Anderson & Krathwohl 2001; Bligh, 2000). Therefore, the discussion method plays an important role in interactive teaching and learning in universities, and especially on effective Knowledge Building.

Theoretical Framework And Hypothesis Development

Knowledge Building

The Knowledge Building supposed to be an output of interactive teaching and learning. Knowledge is a key organizational resource (Analoui, Sambrook, & Doloriert, 2014). Scardamalia and Bereiter (2003) define Knowledge Building as "the production and continual improvement of ideas of value to a community, through means that increase the likelihood that what the community accomplishes will be greater than the sum of individual contributions and part of broader cultural efforts." . One of the explicit principles of Knowledge Building is idea improvement, which encourages the students to improve each other's ideas through various means such as reflecting, identifying relevant information, and conducting empirical experiments (Scardamalia & Bereiter, 1994).

Rajaram and Bordia (2013) revealed that both "active" and "passive" instructional techniques facilitate effective learning and acquiring of knowledge, although literature reports that lectures are the most preferred technique (Cotes & Cotuá, 2014). The active teaching and learning, and cohesion and centralization influence knowledge-building (Rivas, 2009; Tirado, Hernando, & Aguaded, 2015). McQueen and Janson (2016) indicate that the experience-based perceptions about effective knowledge-building processes and strategies may contribute to more effective intake and training programs.

Knowledge Building could be regarded as an output of progressivism and constructivism teaching and learning. Progressivism theory was developed by Dewey (1934) that viewed the school as a miniature democratic society in which students learn the skills necessary for democratic living, include problem-solving and scientific method. Constructivism addresses the nature of knowledge and the nature of learning and treats the individual as actively involved in the process of thinking and learning (Howe & Berv, 2000). In constructivism, learners participate in generating meaning or understanding and cannot passively accept information by mimicking others' wordings or conclusions (Brooks & Brooks, 1993). Progressivism and constructivism theories were used to conceptualize a research framework for this study (Figure 1).

Conceptual framework

The framework for the study was developed from an extensive review of existing evidence about lecture and discussion methods, and Knowledge Building by students. The review began with a search for relevant empirical research through ERIC using the keywords "lecture method," "discussion method," and "Knowledge Building". Figure 1, summarizing the framework resulting from the review, proposes a set of relationships among the three constructs. Lecture and discussion methods' independent variables influence Knowledge Building' dependent variable.

Lecture method and Knowledge Building

The lecture method is supposed to influence the Knowledge Building. Kyle (1972) suggested that the factor which contributed to the adoption of the present lecturing method is the ability to deal with many students at one time, and Stearns (2017) pointed that we need to move from this current instructor-centered teaching model to a student-responsible learning model. Research on the effectiveness of traditional teaching or lectures is somewhat discouraging when compared to other interactive methods of instruction, specifically discussion (McKeachie et al., 1990; Qureshi et al., 2014).

The tutors' comprehension-monitoring and domain knowledge, along with pupils' questions, and interactive learning were significant predictors of knowledge-building (Roscoe, 2014; Van der Steen and Van Frissen, 2017). The flipped class compared to traditional face-to-face lecture class and online class, as well as engage in text-based argumentation is associated positively with higher levels of student engagement (Burke and Fedorek, 2017; Shanthy and Thiagarajan, 2011; Litman et al., 2017) Therefore, based on abovementioned work it is hypothesized that:

Hypothesis # 1: Knowledge Building hasn't been explained by the Lecture method.

Discussion method and Knowledge Building

The discussion method is purported to influence the Knowledge Building to a greater extent than the lecture method. The discussion is a complex teaching method that requires careful planning and preparation and facilitate students' skills to optimize their practice (Brookfield & Preskill, 2005; Oelke, Wilhelm & Jackson, 2016). Discussion engages students in what they are presented within lectures or other class assignments, but several authors provide additional details about the strengths and limitations of discussions (Bligh, 2000;

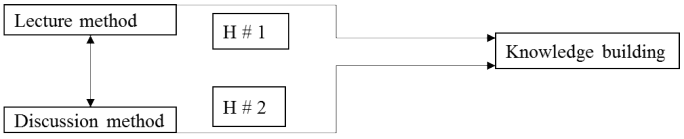

Figure 1: Conceptual framework

Brookfield & Preskill, 2005; Forsyth, 2003). Resendes et al. (2015) explore the ability of students to engage in productive discussion about the state of their Knowledge Building using group-level feedback tools to support their metadiscourse.

The elaborate constructive model-building, education settings, as well as developing ideas as improbable, real-world objects for collaborative and creative knowledge work impact Knowledge Building (Egan, 2012; Baricaua, 2016; Hong & Chiu, 2016). Introduction of collaborative learning environments, skills development activities, and the follow-up in a less time-pressured environment lets students demonstrate improvement in reading comprehension, pace, and text-based discussion skills (Ivy, 2017; Giovacchini, 2017).

The open-ended and whole-class discussion, as well as case study were positively associated with students' achievements (Gamoran & Nystrand, 1991; Nystrand, 1997; Nystrand & Gamoran, 1991; Miles, 2015). Fall, Webb, & Chudowsky (2000) showed that allowing students to engage in a 10-minute discussion of the story in three-person groups was positively related to students' understanding of the story. The active or collaborative methods produce, and inductive methods produce greater gains in student learning than those associated with more traditional or deductive instructional methods (Terezini et. al, 2001; Prince and Felder, 2006). Therefore, based on previous research it is hypothesized that:

Hypothesis # 2: Knowledge Building has been explained partly by Discussion method.

Methodology

Method

The methodology used in the study is based on a quantitative approach and supported by the qualitative approach, so the mixed approach was used in the study. Quantitative approach of research includes mainly collecting and analyzing of structured data that have been shown on the numerical form (Matthews & Ross, 2010); and is been considered a formal, objective and systematic process, and where numerical data has been used to get information from around the world (Burns & Grove, 2005). Fraenkel, et al. (2015) pointed that in correlational research the relationships among two or more variables are studied without any attempt to influence them and describes the degree to which two or more quantitative variables are related.

Sample and data collection

The sample was taken from students from the masters program with the school of social sciences (N = 145), or 7.26% of the population (n= 1995), and from lecturers from the masters program with the school of social sciences (N = 16), or 48.48% of population (n= 33). It is used a combined sample, a random cluster for student respondents, and a purposive one for lecturer respondents. A breakdown of the random cluster sample of students included 113 females (77.93%) and 32 males (22.06%), while the lecturers sample was comprised of 9 females (56.25%) and 7 males (43.75%). The structured questionnaire was used to collect the primary quantitative data from students. Semi-structured interviews were used to collect the primary qualitative data from lecturers. Structured questionnaires, as well as semi-structured interviews, are designed, piloted and applied by the researcher. The findings were summarized in the synthetic way to use as the basis for the analysis.

Analyses

The conceptual framework guiding the study (see Figure 1) was tested using Pearson correlation and multiple regression. Descriptive and inferential methods were the main techniques to analyze the data. Pearson product-moment correlation coefficient was used to assess the relationship between lecture and discussion methods and Knowledge Building. Linear multiple regression was used to assess the ability of one control measure to predict Knowledge Building levels by lecture and discussion methods. Preliminary assumption testing was conducted to check for normality, linearity, outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no violations noted. Coding and categorization technique (Gibbs, 2007) was used to analyze the outputs of semi-structured interviews, therefore qualitative data.

Results

Descriptive analysis

Lecture method vs discussion method' frequencies indicate that discussion method was used in most of the teaching classes (63.9%), and lecture method was used in less of the teaching classes (36.1%) has been used. Referring descriptive statistics, 145 respondents ranging in levels from 1 to 5, with a mean of 3.00 and a standard deviation of .726. This result means that the discussion method has been used much more than the lecture method in teaching.

Knowledge Building 'frequencies indicate that Knowledge Building has been based on discussion method in most of the teaching classes (58.3%), and Knowledge Building has been based on lecture method in less of the teaching classes (41.7%). Referring descriptive statistics, 145 respondents ranging in levels from 1 to 5, with a mean of 3.00 and a standard deviation of .640. This indicates that Knowledge Building has been based more on the discussion method than in the lecture method in teaching.

Inferential analysis

Test of hypothesis

Test of hypothesis # 1: Knowledge Building cannot be explained by the lecture method.

Table 1. Lecture method and Knowledge Building' correlations outputs

Correlations			
		Lecture Method	Knowledge Building
Lecture Method	Pearson Correlation	1	.076**
	Sig. (2-tailed)		.004
	N	145	145
Knowledge Building	Pearson Correlation	.076**	1
	Sig. (2-tailed)	.004	
	N	145	145

**. Correlation is significant at the 0.01 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 1 there is a very low, positive correlation between lecture method and Knowledge Building variables, r = .076, n = 145, p < .005 with high levels of lecture method associated with high levels of Knowledge Building.

Table 2. Lecture method and Knowledge Building' regression outputs

Model Summary[a]									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.097[a]	.009	.008	.581	.006	.251	1	43	.005
a. Predictors: (Constant), LectMeth									
b. Dependent Variable: KnowlBuild									

As shown in Table 2 total variance of Knowledge Building' levels explained by lecture method (the model) was 0.9%, F (2, 581), $p < .005$. In the model, the control measure was statistically significant recording higher standardized beta values (lecture method *beta* = .031; p < .005).

Test of hypothesis # 2: Knowledge Building has been explained partly by discussion method.

Table 3. Discussion method and Knowledge Building' correlations outputs

Correlations			
		Discussion Method	Knowledge Building
Discussion Method	Pearson Correlation Sig. (2-tailed) N	1 145	.283** .002 145
Knowledge Building	Pearson Correlation Sig. (2-tailed) N	.283** .002 145	1 145
**. Correlation is significant at the 0.01 level (2-tailed).			

As shown in table 3 there is a low, positive correlation between discussion method and Knowledge Building variables, r = .283, n = 145, p < .005 with high levels of discussion method associated with high levels of Knowledge Building.

Table 4. Discussion method and Knowledge Building' regression outputs

Model Summary[b]									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.253[a]	.064	.066	.636	.003	1.488	1	43	.002
a. Predictors: (Constant), DiscMeth									
b. Dependent Variable: KnowlBuild									

As shown in Table 4 total variance of Knowledge Building' levels explained by the discussion method (the model) was 6.4%, F (2, 581), $p < .005$. In the model, the control measure was statistically significant recording higher standardized beta values (discussion method *beta* = .024; p < .005).

Qualitative analysis

A near concensus of the lecturers (98.02%) claimed to be in favor of implementing different teaching approaches for master students assuring a great inclusion of students in Knowledge Building. More than two-thirds of the lecturers (69.8%) pointed out that the lecture method occupies approximately 25- 30% of their teaching time. The remaining share of their time is occupied by supporting the process of learning as case studies, different practical situations, analysis, debates, discussions, question-answer interacting, reflections, etc. Almost all the lecturers (97.32%) pointed out that the discussion method is very effective in teaching as creates conditions to analyze and to explain the concepts from the different point of views. 79.86% of lecturers argued that discussion method supports Knowledge Building because the learning process is based on arguments, synthesis, as well as on critical and creating skills. Nearly all of the lecturers (93.45%) indicated that the discussion method accounts for approximately 40- 50 % of their teaching time. During this time students bring out pros and cons arguments, reflections, critical thinking for different issues of teaching content. A majority of lecturers (88.89%) concluded that the discussion method is more effective than lecture method on Knowledge Building. Therefore, in conclusion, qualitative outputs support quantitative results.

Discussion And Implications

Lecture method vs Discussion method

Lecture method versus discussion method's frequencies supported by descriptive values, as well as by qualitative analysis, indicate that there is a considerable difference between the use ofusing of discussion method and lecture method in teaching. So, discussion method has been used much more than the lecture method in teaching. The results of this study, supported by other researchers about the importance of the lecture vs discussion method have important implications for future research on teaching methods. Such research should investigate different teaching methods and their relation to Knowledge Building or other variables.

Knowledge Building

Knowledge Building 'frequencies supported by descriptive values, as well as by qualitative analysis, indicate that there is a considerable difference between knowledge based on discussion method and Knowledge Building based on the lecture method in teaching. So, Knowledge Building based on discussion method has taken place more than Knowledge Building based on the lecture method in teaching. The results of this study, supported by other researchers about the importance of Knowledge Building based on lecture method vs Knowledge Building based on discussion method have important implications for future research on teaching methods. Such research should investigate Knowledge Building based on different teaching methods and their relation to other variables.

Lecture method and Knowledge Building

The value of correlation between lecture method and Knowledge Building indicates that increasing of lecture method values would result in increasing of Knowledge Building. The total variance of Knowledge Building' levels explained by the lecture method was very small. The result was consistent with previously reported works, who argued that lecture method does not influence considerably Knowledge Building (Stearns, 2017; McKeachie et al., 1990; Qureshi et al., 2014; Roscoe, 2014; Van der Steen & Van Frissen, 2017; Burke & Fedorek, 2017; Shanthy & Thiagarajan, 2011; Litman et al., 2017). In conclusion *hypothesis #* 1: *Knowledge Building hasn't been explained by the lecture method,* is been rejected.

Discussion method and Knowledge Building

The value of the correlation between the discussion method and Knowledge Building indicates that increasing of discussion method values would result in increasing of Knowledge Building. The total variance of Knowledge Building' levels explained by the discussion method was relatively low but significant. The result was consistent with previously reported works, who argued that discussion method

influences partly Knowledge Building (Bloom et al., 1956; Anderson & Krathwohl, 2001; Bligh, 2000; Oelke, Wilhelm, & Jackson, 2016; Resendes et al., 2015; Hong & Chiu, 2016; Baricaua, 2016; Egan, 2012; Giovacchini, 2017; Ivy, 2017; Miles, 2015; Gamoran & Nystrand, 1991; Nystrand, 1997; Nystrand & Gamoran, 1991; Fall, Webb, & Chu-dowsky, 2000; Terezini et. al., 2001; Prince & Felder, 2006). In conclusion *hypothesis* # 2: *Knowledge Building has been explained partly by the discussion method,* is been supported.

The results of the study, supported by other researchers about the influence of lecture vs discussion method on Knowledge Building have important implications for future research. Such research should investigate the influence of other teaching methods on Knowledge Building. Overall the findings of this study enhanced theoretical and practical understanding as lecture and discussion methods support differently Knowledge Building.

Recommendations for Practice

Results of this study about the influence of lecture vs discussion method on Knowledge Building have important implications for practice. The faculties should design important training programs on teaching and learning methodologies for faculty members. The faculties should support research on different teaching and learning methodologies by faculty members or different researchers. The faculties should monitor and assess the teaching methodology and Knowledge Building to support student's achievements. The lecturers should use an interactive teaching and support Knowledge Building. The lecturers should use different teaching and learning methodologies that support students' needs. The lecturers should use more discussion method than the lecture method in teaching.

Conclusions

Several limitations of the study should be acknowledged as part of conclusions. First, the measurement of lecture method, discussion method as well as Knowledge Building variables have been made based on self- reported instruments. Second, the study included two teaching methods used in teaching, meanwhile, it is known that there are much more teaching methods used and related to Knowledge Building. The aim of this study was to research the influence of lecture and discussion methods on Knowledge Building by students. The prior assumption was that lecture and discussion methods influence Knowledge Building.

The results showed that the discussion method is used much more than the lecture method in teaching. The results showed that Knowledge Building is based more on discussion than on the lecture method in teaching. The study confirmed that most lectures use discussion method more than the lecture method in teaching sessions, although they appreciate two of them. It is found that there is a very low positive correlation between lecture method and Knowledge Building, meaning that increasing of lecture method values would result in increasing of Knowledge Building, although in small values. It is found that total variance of Knowledge Building levels explained by lecture method is a very low %; the other variance may explain by hidden or unknown variables. It is found that there is a relatively low positive correlation between discussion method and Knowledge Building, indicating that increasing of discussion method values would result in increasing of Knowledge Building. It is found that total variance of Knowledge Building levels explained by the discussion method is a relatively low %; the other variance may explain by hidden or unknown variables.

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