



Developing a Scale to Measure Implementation of a Pedagogy

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Abstract

Teachers' pedagogy is critically important in the educational experience of students. This investigation verified the constructs embedded in the themes that emerged in the students' responses on the implementation of a pedagogy used by private institutions in the Philippines. This pedagogy is anchored on the four components namely: constructivism (Piaget, 1970), elements of understanding by design (Wiggins and McTighe, 2011), differentiated instruction (Tomlinson, 2000) and the 4-pronged approach covering the integration of Ignacian core and related values, contemporary social realities, concepts across subject boundaries and Biblical texts reflection in relation to the concepts taught (Guillano, 2014). The study involves two phases. The first phase is qualitative in nature, involving 414 college participants. The responses on the effects of the implementation of the pedagogy are organized into the following themes: collaborative learning; self-regulation; active involvement; deeper understanding of the lesson; formation of character; and participation in social transformation. The second phase of this investigation utilizes a quantitative design where the items under the foregoing themes were administered to another set of 465 participants. Using exploratory factor analysis, the items loaded into four factors namely Participation in Social Transformation, Values Formation, Active Engagement and Collaboration, and Deep Understanding of the Concept and its Interrelatedness with Life's Realities. To further validate the structures of the items in the scale, the researchers endorse the need for confirmatory factor analysis.

Introduction

The teachers' instructional processes play a crucial role in facilitating the educational experiences of students. As such, Transformative quality education is the thrust of a religious congregation, namely the Religious of the Virgin Mary (RVM), to describe the ministry they share with the Church in its mission of evangelization in contemporary times.

In its effort to contribute to transformative quality education, the education ministry of the Religious of the Virgin Mary conceptualized the RVM Pedagogy. This pedagogy comprises four components namely: constructivism (Piaget, 1970); elements of understanding by design (Wiggins and McTighe, 2011); differentiated instruction (Tomlinson, 2000); and the 4-pronged approach which covers the integration of: a) Ignacian

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core and related values, b) contemporary social realities, c) concepts across subject boundaries / other disciplines and d) Biblical texts reflection in relation to the concepts taught (Guillano, 2014).

Values formation is an integral part of transformative education as it builds the students' character along with the development of their competence. Integration of social realities in instructional processes is also considered as an important component in this pedagogy. North (2009) posited that educators should help students become actively engaged in the learning process that would lead them to contribute to the building of a better community.

Another important component of the pedagogy is the integration of the lesson across disciplines. Cohen (1985) claimed that "the history of science shows that **integration across disciplines** is a critical component of scientific progress". This is because "integration forces people to ask new questions, fill gaps in understanding, facilitate information flow among disciplines, and bridge dichotomies that arise due to divergence in disciplinary paradigms" (Pickett et al., 1994).

The last component of the four pronged integration is the Biblical integration. Bagley and Bincer (2017) advanced the idea that the goal of Biblical integration is to help students think biblically and critically about every subject, and about every aspect of their lives. Ideally, students should seek to see each subject the way God sees it. The authors further noted that when students truly understand something from a biblical perspective, they gain a greater understanding of the character or nature of God, or have a greater understanding of how God designed things to be.

The RVM Pedagogy has adopted the principles of constructivism which is exemplified in its approach of activating students' prior knowledge as well as encouraging the students to engage in meaning based on their learning experiences while connecting the lesson to biblical text, to other disciplines, to social realities and to the core values of the institution.

Moreover, cognizant of the dynamism of the learning processes that occur in the classrooms, and the diversity of teachers and learners, the researchers find it imperative that a study be conducted to gather information about the experiences of the students on the implementation of the pedagogy.

The first phase of the study focuses on how the various components of the pedagogy helps students through an open-ended question by asking them to cite

instances when the pedagogy helped them. From the responses of the students, six themes emerges, namely: collaborative learning; self-regulation; active involvement; deeper understanding of the lesson; formation of character; and participation in social transformation.

The second phase of the study involves the development of a scale on the effects of the implementation of the pedagogy, based on the items generated from the first phase of the study. This is done so that the instrument can be used in the RVM schools implementing the pedagogy.

Literature

The Transformational Learning Theory originally developed by Jack Mezirow is described as being "constructivist, an orientation which holds that the way learners interpret and reinterpret their sense experience is central to making meaningful learning" (Mezirow, 1991).

Constructivism as a learning theory has been considered as one of the paradigm shifts in the field of education in recent years. Moallem (2001) writes that constructivism speculates that knowledge does not exist independent of the learner, but is constructed by the learner. Fitzgerald (2011) asserts that if learners control their educational process by being more fully embedded in it, they will possess deeper ownership over its mastery. She further suggests that constructivist learning strategies can help students to develop the competence (and empowerment) they need to engage with their own learning communities fully.

In relation to values formation, Lickona (1992) in a translation by Wamaungo (2012) postulates that character education should involve "moral knowing, moral feeling, and moral action," which necessitates the interplay of the cognitive, affective and behavioral domains of learning. Hadi (2015) further upheld that education does not only aim at mastery of knowledge but also on the formation of character. The author expounds that the character or values formation of students is an imperative for all teachers.

The integration of social realities in the instruction is advocated by Gay (2012) who emphasizes that if students are to become "informed and skilled social change agents, they should understand the nature and complexities of societal, individual and institutional reform."

This need was likewise upheld by Hahn (2010) who postulates that "when students perceive that sever-

al sides of issues are presented and discussed, and when they feel comfortable expressing their views, they are more likely to develop attitudes that foster later civic participation." Furthermore, Barton (2012) asserts that discussion in the classroom can assist educators in achieving the aims of developing students into rational, autonomous, and open-minded citizens capable of entering into a pluralist society.

Methodology

Design

The instrument development model is used in the study. Specifically, it combines qualitative and quantitative approaches. The first phase consists in the generation of items on the effect of the implementation of the pedagogy on the students. The second phase involves the examination of factors or dimensions of such items through Exploratory Factor Analysis. This examination is most often applied in the development and validation of measures (Schonrock-Adema, Heijne-Penninga, Van Hell & Cohen-Schotanus, 2009)

Item Generation

A total of 414 college students who experienced the implementation of the RVM Pedagogy in their instructional processes responded to an open-ended question, namely "*Cite instances when the pedagogy helped you.*" Their responses, in qualitative form, were recorded and analyzed. From these responses, six themes emerge; namely: 1) collaborative learning; 2) self-regulation; 3) active involvement; 4) deeper understanding of the lesson; 5) formation of character; and 6) participation in social transformation.

A questionnaire containing the items under the foregoing themes was prepared to develop a scale that measure the effects of the implementation of this pedagogy. It employed a 5-point Likert scale ranging from 1 ("least true to you") to 5 ("most true to you").

Content Validation

This questionnaire used in the study was subjected to content validation by four (4) administrators in RVM schools who have a working knowledge of the pedagogy. They gave suggestions on the relevance of the items, clarity and conciseness of the wordings. This was

done to ensure that the item measured only one idea and to prevent multiple-barreled items. After incorporating the revisions, the questionnaires were administered to a total of 465 participants from three (3) RVM tertiary schools in Northern Mindanao. Of the participants, 61.7 percent were females; 36.8 percent were males and 1.51 percent did not indicate their sex; and the average age is 19.98 years old.

Data Analysis

To explore the structure of the items and to examine its construct validity, exploratory factor analysis is used. This is to reduce the set of observed variables to a smaller, more parsimonious set of variables (Hinkin, Tracey, & Enz, 1997). To determine the factors, a factor loading should be greater than .3 (Costello and Osborne, 1997); and to retain the items, there should be no item cross loadings (Ferguson, 1993 as cited by Kitreerawuttiwong, Sriruecha, & Laohasiriwong, 2015).

Results

The results of the exploratory factor analysis with varimax rotation reveals a scale which consists of a total of 77 items under four factors as suggested by the scree plot with a minimum of .5 in the factor loading, and a minimum Eigenvalue of 1. Twenty six (26) of these items belonged to Factor 1 which is labeled as *Participation in Social Transformation*; twenty (20) of them are loaded under Factor 2 named as *Values Formation*; sixteen (16) items belong to Factor 3 identified as *Active Engagement*; and fifteen (15) items were categorized under Factor 4 namely *Deep Understanding and Interrelatedness to Life's Realities*.

From the original 82 items before the factor analysis, 5 items were excluded; namely items 5, 6, 34, 35 and 54. Item 35 did not load in any factor; and item 54 cross loaded in Factors 1 and 2. Costello and Osborne (2005) suggest that the decision to drop cross loading item from the analysis may be a good choice if there are several adequate strong loaders on each factor.

In this current study, item 54 suggests that it shares the elements found in Factor 1 as well as Factor 2 and since there were already 26 items in Factor 1 and 20 items in Factor 2, the researchers deem it appropriate to exclude item 54. Bartlett's test of sphericity is significant ($\chi^2 = 27485.355$, $p = .000$), and KMO value is 0.974.

Table 1 presents the factor loadings and item statements of the scale on the Effects of the Implementation of the RVM Pedagogy

Table 1. Factor Loading and Item Statements

		Factor Loadings			
		1	2	3	4
Factor 1: PARTICIPATION IN SOCIAL TRANSFORMATION					
<i>The RVM Pedagogy...</i>					
57	develops my sense of respect towards other people's beliefs	.522			
58	makes me practice excellence	.568			
59	enables me to gain holistic formation	.562			
60	guides me in adjusting to diverse situations in life (society, school and workplace)	.631			
61	helps me find new ways of learning	.609			
62	allows me to acquire new knowledge that I could integrate in my life	.617			
63	enables me to think critically and analytically	.627			
64	enables me to use alternative plans to finish our project	.596			
65	motivates me to change	.621			
66	helps me to be disciplined / focused	.618			
67	helps me to have positive outlook in life	.642			
68	enables me to develop my study strategy	.696			
69	nurtures my spirituality, inspiring me to become a good steward of God's creation	.600			
70	enables me to serve the needy especially the sick, etc.	.650			
71	trains me to be service oriented toward the less fortunate in the community	.665			
72	makes me reflect on current social issues and do something about them	.741			
73	helps me treat everyone equally without prejudice	.682			
74	reminds me how to become good / responsible members of society	.716			
75	allows me to be aware of what's happening around me	.702			
76	helps me preserve the Earth by doing good thing and reminding others	.707			
77	develops my affection to the needy	.674			
78	makes me volunteer in service-related programs and activities	.704			
79	motivates me to change things that are needed	.687			
80	helps me to contribute to social and economic development	.716			
81	nurtures my consciousness for a better society	.768			
82	keeps me vigilant with social issues	.710			
Factor 2: VALUES FORMATION					
<i>The RVM Pedagogy...</i>					
34	helps me integrate the spiritual dimension in the lesson at hand				
35	enlightens my mind to do what is right				
36	enables me to put God first and act accordingly	.561			
37	helps me follow God's will through integration in subjects	.638			
38	opens my mind on how to act well and follow what is right	.659			
39	helps me in becoming a more open minded student	.654			
40	enhances my awareness of what is right and wrong	.678			
41	inspires me to do more for God's greater glory through biblical text reflections	.737			
42	helps me improve my character	.680			
43	teaches me the value of integrity	.676			
Factor 3: ACTIVE ENGAGEMENT & COLLABORATION					
<i>The RVM Pedagogy...</i>					
1	makes our class alive / active				.565
2	encourages us to do our part to learn like doing our projects / assignments				.575
3	provides learners the opportunity to generate ideas through group sharing				.688
4	helps me in being creative				.670
5	makes learners link/relate the learned concepts to life's realities/ experiences				
6	makes me feel bored during classes *				
7	helps me to create concepts for my future job				.523
8	makes us discuss in class what we observe in the community / news				.504
9	allows us to participate to learn new things				.619
10	encourages us to collaborate				.657
11	allows us to integrate our ideas in group discussions to gain meaningful concepts				.669
12	helps us find new ways to interact more				.659
13	makes us do group activities that challenge our knowledge and ability to excel				.622
14	develops my value for teamwork				.676
15	enables us to link our personal point of view with others in group discussion				.571
16	enables me to generate ideas through group sharing				.602
17	empowers me to construct ideas with my team				.574
18	enables me to learn from diverse opinions in group sharing				.559
Factor 4: DEEP UNDERSTANDING & INTERRELATEDNESS TO LIFE'S REALITIES					
<i>The RVM Pedagogy...</i>					
19	enables learners to have a new experience of the concept				.548
20	enables me to understand the lessons/ learn even if these are challenging				.581
21	helps me apply new knowledge to daily living / workplace / real situations				.606
22	helps me connect my past experiences to the lesson enabling me to learn more				.578
23	helps students see the bigger picture				.538
24	helps me to understand by relating the lesson with the social realities				.638
25	provides a concrete image of reality by reflecting the social world in class				.663
26	uses relevant concepts that helps me become effective in my chosen career				.675

27 enhances my learning	.632
28 makes me more updated in my chosen career	.615
29 enables me to discover new things	.635
30 broadens my knowledge through the construction of new concepts	.591
31 helps me see the interrelatedness of the lesson to other disciplines	.570
32 makes me see connection of the lesson to different cultures	.604
33 widens my knowledge with the integration of other subjects in the lesson	.619
Total Variance Explained from the Rotation Sums of	16.54 13.87 10.62 10.05
Squared Loadings	
Percentage of Variance	20.94 17.55 13.44 12.73
Cumulative Percentage	20.94 38.49 51.93 64.66

Data shows that the first factor accounted for 20.94% of the variability of the items, followed by the other factors. Table 2 presents the descriptive indeces of the four factors. The Cronbach's alpha in each factor show that the items have high internal consistency (.955 to .979).

Table 2. Descriptive Indeices of the Four Factors

Factor	No. of items	Cronbach's α	M	SD
1 Participation in Social Transformation	26	.979	4.13	.70
2 Values Formation	20	.974	4.18	.93
3 Active Engagement and Collaboration Deep Understanding of Concept and Its	16	.955	3.95	.76
4 Interrelatedness to Life's Realities	15	.957	4.02	.74

Discussion

Results of the exploratory factor analysis reveal four factors on the extent of implementation of the pedagogy. The themes on self-regulation and formation of character which emerge in the first phase of the study are subsumed under *Values Formation*. Moreover, items on active engagement and collaboration are merged, based on the factor loadings in the second phase of the study.

The twenty-six items that load to Factor 1 point to **Participation in Social Transformation**. The items in the said factor characterize the participants' disclosures that pedagogy has influence on highly cognizant and reflective of societal realities impelling students to actualize service-related programs and activities contributing to social and economic development.

This finding is in consonance with the postulation of North (2009) who emphasizes that educators should help students become actively engaged in the learning

process that would lead them to contribute to the building of a better community. Further, Gay (2012) advocates that students are to become "informed and skilled social change agents, they should understand the nature and complexities of societal, individual and institutional reform."

In the same vein, Hahn (2010) upheld that when students are given ample opportunities to discuss several sides of issues and "when they feel comfortable expressing their views, they are more likely to develop attitudes that foster later civic participation." Furthermore, Barton (2012) asserts that discussion in the classroom can assist educators in achieving the aims of developing students into rational, autonomous, and open-minded citizens capable of entering into a pluralist society.

It is likewise interesting to note that part of the participation in social transformation as disclosed by the participants is the facilitation of their ability to think critically and analytically which may enable them to *adjust to diverse situations in school and in the community where they belong, to have a positive outlook toward life, to be disciplined and focused, to treat everyone without prejudice, to serve the needy, and to help preserve the environment.*

The reported participants' viewpoints are closely linked to the institution's vision which states, "We, the Ignacian Marian Community, witness the loving compassion of Jesus and the Ignacian Marian values, empower and nurture learners to be competent and humble leaders committed to social renewal for the common good". Additionally, students reveal that the integration of social realities in the lesson facilitate better absorption of the lessons as well as encouraging them to participate in the classroom interaction.

The students' experiences in this study confirm the findings of Tannebaum and Hughes (2015) who assert that the aims of education are seen as larger than simply having students remember information for summative assessments. Instead, participants frequently spoke and wrote about the need for the larger educational system to *prepare students to become citizens who participate in society, are open to new ideas, and are capable of voicing their opinion through a variety of mediums.*

The twenty items that loaded under Factor 2 relate to **Values Formation** highlighting their revelations that the said pedagogy helps students in their character and moral formation. Such instructional process enables them to raise their level of consciousness that God *guides them*

on what is right and what is wrong.

The pedagogy also enables them to *follow God's will, to put God first and act accordingly, and to become good models*. This is most likely to happen because part of the component of the pedagogy is the integration of Ignacian core and related values, b) contemporary social realities, c) concepts across subject boundaries/other disciplines and d) Biblical texts reflection in relation to the concepts taught" (Guillano, 2014).

The aforementioned responses are indicative of the effect of this integration in instruction. Values formation, which is an integral part of transformative education, builds the students' character along with the development of their competence. Wamaungo (2012) postulates that character education should involve "moral knowing, moral feeling, and moral action," which necessitates the interplay of the cognitive, affective and behavioral domains of learning.

Hadi (2015) further upheld that education does not only aim at mastery of knowledge but also on the formation of character. The author expounds that character or values formation is an imperative of all teachers.

The afore cited finding is also upheld by Corrigan, Dillon & Gunstone (2007); and Kang and Glassman (2010) when they emphasize that values, morality and ethics are part of a person's life and these cannot be separated from society. Emphasizing the crucial importance of character education, Bullough (2011) contends that teaching is fundamentally a moral enterprise pointing to the imperative that teachers engage in moral activities through their teaching profession.

Items that loaded in Factor 3 are labeled as **Active Engagement and Collaboration**. This is characterized as *enabling the participants to create concepts essential for their job, discuss community issues, collaborate, link one's personal point of view with others in group in order to gain meaningful concepts, do group activities that challenge one's knowledge and ability to excel and generate ideas through group sharing*.

The participants' further reveal that the pedagogy helps to develop the value of teamwork as well as their creativity; not to discount that the instructional process makes their learning experience fun and alive. The afore cited finding is also upheld by Corrigan, Dillon & Gunstone, (2007); and Kang and Glassman, (2010) when they emphasize that values, morality and ethics are part of a person's life and these elements cannot be separated from society.

Emphasizing the crucial importance of character education, Bullough (2011) expounds that teaching is fundamentally a moral enterprise pointing to the imperative that teachers engage in moral activities through their teaching profession.

The participants' emphasis on meaning creation with the help of the group is corroborated by the postulation of Prince (2004) which recognizes the adoption of instructional practices that engage students in the learning process. This is a defining feature of active learning. Dooley (2008) also mentions that through collaboration, students may come to see the importance of taking responsibility for their own learning and feel empowered to do so while learning to respect the opinions and work of their partners.

Moreover, Fitzgerald (2011) asserts that if learners control their educational process by being more fully embedded in it, they will possess deeper ownership over its mastery. She further suggests that constructivist learning strategies can help students to develop the competence (and empowerment) they need to engage with their own learning communities.

There were 15 items that loaded in Factor 4 labeled as **Deep Understanding of Concept and its Interrelatedness to Life's Realities**. The items point to the participants' responses that the pedagogy enables them to *understand the lesson deeply, apply the new knowledge to life's realities, relate the lesson to social phenomena, connect their past experiences to the lesson enabling them to learn more, and see the interrelatedness of the lesson to other disciplines*.

As defined by Grotzer (1999), deep understanding generally refers to how concepts are "represented" in the students' minds and most importantly how these concepts are "connected" with each other. The author further espouses that deep thinking involves being able to make further connections between the webs of concepts. The foregoing concepts are upheld in the present study.

Jensen and Nickelsen (2008) also claim that deep understanding is the "acquisition of new content or skills that must be learned in more than one step and with multiple levels of analysis or processing so that students may apply the content/skills in ways that change thinking, influence, or behaviors."

Further, worth noting among their responses is their disclosure that the instructional process helps them *discover new things and construct their own learning*. These responses are linked to the other components of the pedagogy namely: constructivism (Piaget, 1970); 2)

elements of understanding by design (Wiggins and McTighe, 2011) and 3) differentiated instruction (Tomlinson, 2000).

Conclusion

In a nutshell, the scale captures the effects of the implementation of the pedagogy that are expressed in the following factors: 1) Participation in Social Transformation; 2) Values Formation; 3) Active Engagement and Collaboration; and 4) Deep Understanding and Interrelatedness to Life's Realities.

It is a widely accepted imperative that success must be measured. The development of a scale to measure the effects of the implementation of the pedagogy is relevant in the educational landscape. Generated from a qualitative study, these constructs which are validated through exploratory factor analysis may be used to determine the effects of the instructional processes used in religious sectarian higher education institutions in the Philippines.

Suggestion (or recommendation)

Cognizant of the need for a tool to measure the implementation of a pedagogy used in the private educational institutions in the Philippines and in other parts of the world, particularly in the schools administered by the Religious of the Virgin Mary (RVM), the researchers recommends the use of the instrument validated in this study. Nevertheless, there is a need to conduct confirmatory factor analysis to further refine the structures, given the unique contexts of the schools in the regions that intend to utilize the instrument.

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