Moral reasoning courseware for problem-solving in Values Education: Grade 8 students' performances

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Abstract

A prototype Values Education courseware was developed in this study to use it as supplementary learning material to sharpen the moral reasoning skills of grade 8 students. The prototype courseware was designed according to the higher-order thinking skills of Bloom's Taxonomy of educational objectives, which are barely reflected in the existing Values Education curriculum of the Philippines public schools. After having subjected the courseware to formative and summative evaluation by content and instructional design experts in Values Education, philosophy of education, educational psychology, curriculum studies, and educational technology and by target end users, a quasi-experimental analysis revealed that the use of the courseware resulted in significant improvement of student-participants' moral reasoning skills. Thus, problem solvers who want critical thinking skills for problem-solving could significantly increase their abilities for the said task given the suitable assistive methods, tools, and training.

Keywords: moral reasoning, educational technology, courseware, Values Education, character education, critical thinking

INTRODUCTION

Values Education is an indispensable component of education in all countries, even if its substance and form often significantly vary from one culture to another. Despite this, different versions of Values Education across

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cultures overlap as it is usually "based on values and virtues, designed to encourage certain moral and ethical characteristics in individuals" (Mill, 2022). In the Philippines, Values Education was once a mere and obscure part of the subject areas in the basic education curriculum, until it was developed into and taught as a separate subject area at the secondary level of schooling in 1989 (Quisumbing, 1994). Philippine Values Education was then crafted to inculcate pre-selected values in schoolchildren, an approach that finds support in Berges-Puyó's (2021) philosophy of Values Education. In 2002, the Philippine Department of Education (DepEd) introduced the so-called *Makabayan* values, which were similarly designed to instill the values of devotion to God, patriotism, environmentalism, and humanism (*maka-Diyos, makabayan, makakalikasan,* and *makatao*). These four core values became the moral educational standards of the Philippine Department of Education (DepEd) for teaching Values Education in the Philippines (Ignacio, 2017). The subject would later be reconstructed to guide the students to find the Aristotelian path to living a virtuous life. Such a goal is expressly embedded in the DepEd's curriculum guides titled *Gabay sa Kurikulum ng Edukasyong Secondary ng 2010, Edukasyon sa Pagpapahalaga, Unang Taon* (Guide to the Secondary School Curriculum of 2010, Values Education, First Year level) and *Gabay sa Pagtuturo ng Edukasyon Pagpapahalaga 11* (Guide to the Teaching of Values Education 11). In 2015, the DepEd renamed the subject, and hitherto it is called *Edukasyon sa Pagpapakatao* (roughly, this may be translated as "education on how to conduct oneself as a human being"). It may be noted that the current pedagogical approach in Philippine public school Values Education remains wanting in exercises for critical thinking. Instead of training students to critically address evaluative problems (e.g., moral problems, ethical issues), it instructs students to adopt pre-selected values that may be questioned only for argument's sake, i.e., cannot be rejected (Muega, 2012). On this, Wringe (2006) reminded that values ought to be subjected to critical examination.

A simple set of rules will not suffice to make a good case for moral education because rules could change depending on the force of circumstances surrounding them (Wringe, 2006). Hirst (1999) said that an ethically good life is defined by sustained rationality. The advancement of reason carries the development of rational values (e.g., open-mindedness, honesty) for one to count as a morally good person or someone who is both an individual and a member of his/her society (Milvain, 1996). In the Philippine education system, there is a discernible paucity of evidence that Values Education is aptly and mainly designed to develop the moral reasoning abilities of schoolchildren.

Moral matters that are inextricably linked to the advancement of civilization require well-informed and -thought answers. Thus, an education that

seeks to develop students' moral character ought to promote reflective thinking (Arthur et al., 2017). The critical search for viable solutions to moral problems is of utmost importance (Bebeau, 1995, In Bebeu et al., 1995), especially when values like freedom, life, social justice, and peace are the ones that are at stake. The kind of values education in view here jibes with the character education in which the tension between conflicting virtues is resolved using analytic and reasoned thinking (Arthur et al., 2017)

Departing from the current practices in Values Education in the Philippines, Muega (2008) proposed the use of moral reasoning templates for decision-making or problem-solving. Such a device was developed to sharpen the moral reasoning skills of the students of Values Education. Muega's approach is premised on the belief that students of Values Education should learn to analyze critical concepts, reflect on moral matters, resolve ethical issues, and make well-informed decisions when addressing moral predicaments or dilemmas (Kilpatrick, 1992; Straughan, 1982). Muega (2006) said that just like in Science and Math education, reflection, problem-solving, and discourse in Values Education should be defined by critical thinking and reasoning. Zeidler and Keefer (2003) similarly held Muega's dialectical view that discourse in Values Education is instrumental in developing the student's ability to approach evaluative matters rationally.

In sum, a form of Values Education oriented toward teaching critical thinking for effective evaluative problem-solving consists of contents and exercises that are determined by intellectual values such as open-mindedness, disciplined thinking, humility, and curiosity (Wilson, 2017).

Thinking and Technology in Values Education

Cultivating human reason contributes substantially toward improving the quality of human life (Hirst, 1999). As an aim of Values Education, the rational faculty could be developed by deploying a program specially designed to sharpen the ability of the students to engage in evaluative problem-solving (Milvain, 1996). The last three levels of the revised version of Bloom's taxonomy (Anderson & Krathwol, 2001) benefit this project. This was demonstrated in Eber and Parker's (Fall 2007) work, where student learning was assessed using Bloom's idea of higher-order thinking.

The dilemma approach plays a vital role in a form of Values Education that primarily seeks to develop students' ability to address evaluative problems. The exercises in view could be taught in the traditional educational setting.

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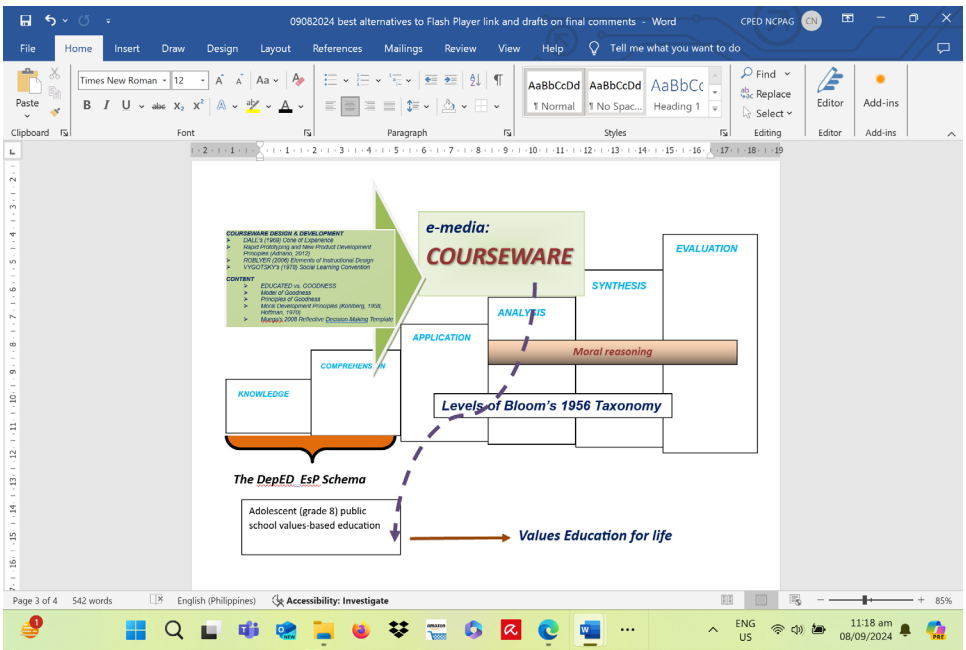
Nevertheless, it is best to complement classroom activities with digital technology that could be made readily accessible to students in various regions of the country.

In this study, multimedia courseware was developed to facilitate the optimization of students' learning of critical thinking in Values Education. The courseware developed in this research was "an e-lecture or virtual lecture" (Monsakul, 2008, p.5) that could be used as an alternative or complement to the existing learning materials in Values Education. The device is interactive in form; hence, it is not far removed from the learning engagements that happen in real space and time. Currently, various courseware materials are being used in various basic education curriculum subject areas. Espiritu (2006) found that the value impact of technology integration in education translates into substantial pedagogical support. For instance, Montienvichienchi and Melis (2006) reported that using courseware could readily rectify students' errors in learning. George-Palilonis and Filak (2009) thus said that the inclusion of technological learning devices is a potent innovation for advancing student learning.

THEORETICAL FRAMEWORK

Figure 1
Theoretical Framework



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The authors of this article developed a prototype Values Education courseware for high school students. It was designed to determine the learners' performance before and after using the device. The study sought to identify the major elements that constitute an effective courseware for moral reasoning in Values Education. The elements constituting a Values Education courseware on students' moral reasoning were studied using Roblyer's (2006) courseware design model and the revised Taxonomy of Bloom (Anderson & Krathwol, 2001) as frames of reference. Figure 1 is the schematic presentation of this study's theoretical framework. It shows that its primary goal was to direct values instruction toward developing students' critical thinking skills.

Educational technology theories were considered, such as the combined schemas of Dale's (1969) Cone of Experience and Dick and Reiser's (1989) (cited in Molenda et al., 2002) instructional design model, to enhance retention and transfer of learning through the courseware. To ensure rigor in the moral reasoning exercises, the humanistic learning perspective was employed, such as the one espoused by Hoffman (1970) (in Papalia, 2010) on the Cognitive Sense of others or the concept of Jack Mezirow (1991) on Transformational Learning and Muega's (2008) reflective decision-making template needed in the evaluation and processing of moral issues. The following hypothesis was tested: There are significant differences between the mean moral reasoning scores of student groups before and after exposure to the Values Education courseware.

MATERIALS AND METHODS

The study used an exploratory sequential multi-methods research design to develop the courseware. The investigation focused on the conceptualization, design, and preliminary testing of the courseware for public Filipino grade 8 students. The courseware was aligned with Go's (2010) new commercial product development and with De Hoog et al.'s (in Gustafson, 2001) rapid prototyping model for constructing instructional materials using technology. Its development was guided by two important instructional design theories: Dale's (1969) Cone of Experience and Gagne's 9 events of instruction (Gagne et al., 1992, in Adriano, 2012). Roblyer's (2006) essential qualities of courseware material were also used in the construction of the courseware, based on the following criteria: (1) instructional design and pedagogical soundness; (2) content; (3) user flexibility; and (4) technical soundness.

To find other elements that constitute effective courseware for Values Education for high school students during the formative evaluation of the courseware, content analysis of relevant materials and consultation with content experts and instructional designers were conducted. The content experts consisted of tertiary

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professors from the areas of Values Education, Educational Technology, Educational Psychology, and Curriculum Studies all of whom were interviewed to inform the development of the courseware. Master's students in education also participated in the focus group discussion for the same purpose.

In compliance with the general research ethics Principles of "Non-maleficence and Beneficence" and "Respect to a Person" based on the 2013 Universal Declaration on the Helsinki Ethical Principles for Medical Research Involving Human Subjects (PHREB, 2017), forms on informed consent for the respondents who were 18 years old and above were prepared. Parental permission and the child's assent for respondents who were minors were prepared and were duly accomplished by parents and respondents, respectively. Appropriate informed consent was also secured from the older group of respondents. These forms served as requirements before the respondents could proceed as participants. The "informed consent" protocol aimed to "provide sufficient information so that a participant can make an informed decision about whether or not to enroll in a study or to continue participation" (PHREB, 2017).

Quasi-experimentation method was employed to test the ability of a selected group of public high school students to engage in moral reasoning. Before it was used, content experts and instructional designers subjected the courseware to pre-evaluation. It was then field-tested among public high school students and further evaluated by content experts and instructional designers. The study was conducted in a computer-equipped public high school in Quezon City, Philippines. The field testing took over an hour and was administered to a high-achieving group of grade 8 high school students.

Teachers and students of Values Education from another high school in Quezon City served as summative evaluators of the final version of the courseware. Only items that passed the evaluation of experts and target learners were used. A before-and-after quasi-experiment procedure was employed to test the effects of the courseware on the students' moral reasoning skills. Students were subjected to a pretest and a posttest to determine their performance before and after exposure to the instructional material. Respondents were students enrolled in the top section of grade 8 students in Quezon City. The pretest and posttest were given to a class of 50 students, who were grouped into three. Data were collected for three months.

The same open-ended questionnaire that presented a moral reasoning situation was used to measure the students' moral reasoning skills before and after the introduction of the courseware. The raters evaluated the students' moral reasoning skills in terms of the following: (1) clarity and precision of language (30%); (2) strength of evidence (30%); and (3) consistency of reasoning (40%). To analyze results during

the formative and summative evaluation of the courseware, transcript analysis tools (TAT) (content analysis tables, charts, and graphs) were used to examine the data.

For the quasi-experiment, the data collected were analyzed using (a) a t-test for correlated samples (to test the hypothesis that there were significant differences between the change in moral reasoning scores before and after participants were exposed to the courseware) and (b) Kendall tau b and W Coefficients of Concordance to test the agreement of the moral reasoning scores among the raters.

Elements Constituting a Courseware for Moral Reasoning in Values Education for Grade 8 Students

A jury of experts from the areas of Values Education, educational psychology, curriculum and instruction, educational technology, and the Filipino language and user (student) evaluators (during one-on-one interviews and FGD) were consulted in selecting the topics that were included in the courseware. The analysis of the data was anchored on a set of elements of sound courseware. These elements are instructional design, skill in crafting the prototype, material flexibility, and program effectiveness (Roblyer, 2006). Before it was finalized, select educators also assessed the developing courseware using Roblyer's (2006) questionnaire. The courseware development was also informed by Vygotsky's (1978) (in Papalia, 2010) social learning convention for facilitating brainstorming among the student groups as they devise solutions to problems in a given ethical situation and present the group analysis in class. Dale's (1969) cone of experience, sounds, colors, game simulation, discussion, and assessment also guided the modification of the courseware into a culturally and gender-sensitive and age-group receptive tool concerning content and design (e.g., visual effects, animations).

To make the courseware more engaging for the target age group of 14-year-old learners, the following were included in the courseware: (1) conventional multiple-choice questions with feedback for all answers; (2) game simulations to apply theories discussed; (3) off-line discussion among student groups to incorporate the potent social learning environment in honing students with moral reasoning skills; and (4) familiar teenage day-to-day stories to concretize discussions. Filipino, which is the language of the EsP, was adopted as the medium of instruction and learning in the courseware. To further facilitate the development of the courseware, the rapid prototyping and product development conventions of Gagne and Dick, and Reiser (in Adriano, 2012), Go (2010), and De Hoog et. al. (in Gustafson, 2001) was also applied.

The shortlist of courseware contents was based on concepts that could be categorized under Bloom's higher-order thinking skills of application, analysis,

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synthesis, and evaluation, as well as those that fall within the scope of values clarification and values analysis approaches in Values Education.

During the FGD with master's students in education, it was observed that designing a courseware in Values Education for Philippine high schools is something novel. Making courseware materials culture-sensitive and learner-type adaptive is also something new. A culturally contextualized courseware titled *"Ito ba Talaga ang Trip Mo? Unang Hirit Tungo sa Mapanimdim na Pagdedesisyon"* (Is this Really What You Want? First Step Towards Reflective Decision Making) was constructed for this study. As narrated above, utmost diligence was exercised to ensure that the instrument is sensitive to the prevailing circumstances (i.e., interests, language, experiences, etc.) of Filipino teenagers in the Philippines.

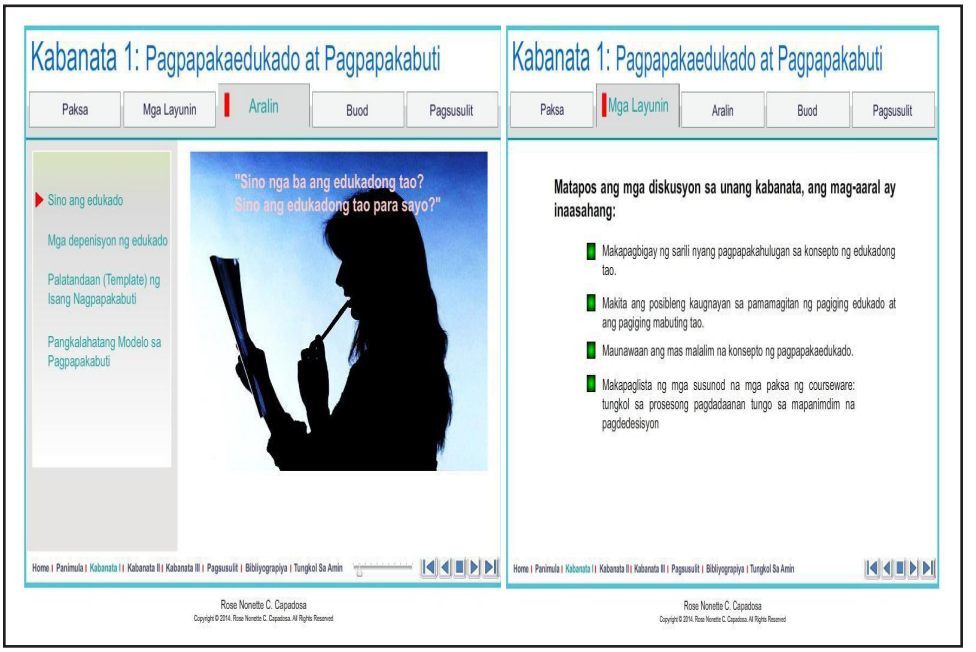
Prototype Values Education Courseware

Figure 2
Courseware Homepage

The design and layout of the courseware were enhanced using images and colors and guided by considerations like interactivity and landscape to make the application more appealing to its intended users. The courseware front page was constructed for this purpose, as evidenced by Figure 2. The figure shows the homepage with navigational buttons, with the middle right side leading to the brief

description of the courseware with route-finding instructions, then the start button to begin the lessons.

Figure 3
Sample Chapter Format



In Figure 3, the buttons aligned horizontally just above the lower margin comprised the major parts of the courseware, namely, the Introduction *(Panimula),* Chapter 1 (*Kabanata 1* About Being Educated and Being Good), Chapter 2 (Kabanata 2 about the Different Approaches to Being Good), Chapter 3 (*Kabanata 3* about the Template for Reflective Decision Making), and the Long Quiz for all the topics discussed. Note that all Chapters still comprise their assessment of the topics discussed. The Bibliography followed the buttons for the main parts of the courseware for published, unpublished and online sources of the course topic, theories, and concepts discussed and of online images used and then the button titled *"Tungkol sa Amin"* ("About Us") corresponding to pertinent information about the general project description, the author of the courseware, the advisers, and the technical support. The buttons near the lower margin were uniform for all pages, including those for the assessment part for Chapter 3 (which is a simulated game) of the courseware.

The format for all three (3) chapters was the same (see Chapter 1 in Figure 3 below). It started with the topic *(Paksa)*, followed by the learning objectives *(Mga*

Layunin), then by the actual lesson discussions *(Aralin)*, then by the Chapter Summary *(Buod)*, and, finally, by the assessment *(Pagsusulit)*. Each page also had an audio control to set the volume at the desired loudness or remove it. After the volume control tool, there was a button for navigating to the first, last, or previous pages and a stop button.

All previous features demonstrated elements of good instructional design and pedagogical soundness. The courseware allowed the user, under an appropriate amount of physical dexterity, to gain a high degree of control over the presentation rate for forward and backward movement and branching upon request and in providing a comprehensive teaching sequence. The description button also enabled the user to see how the program works. The program also demonstrated a matching of content and required curriculum objectives, a match between the teaching strategy and student needs and levels, and the grounding of the material on accepted methods. The courseware description button *(Deskripsiyon)* included the description of the courseware and the learning objectives of the entire course. The learning objectives for the courseware were supported by the learning objectives of the individual chapters and are further dealt with in the chapter lesson proper *(Aralin)*.

The courseware was flexible enough such that the student can navigate in it easily. The design also included feedback for correct answers, which facilitates learning and develops the students' ability to evaluate their own answers. The technical soundness of the program was also recognized when the raters navigated on and tested the courseware, i.e., consistency in loading, any breaking of the program, ability to perform as the screen says, ability to work on the desired platform, and ability of its animations and video to work as described.

The courseware was initially constructed in the study using Adobe Action Script program to make the application interactive through animation using audio, video and games. Adobe Flash Player was used to view and play the courseware. However, because of the Flash Player's end of life in 2020, the possible replacements for the Adobe Flash Player used in the study, as recommended by programmers, include HTML5, WebGL, and WebAssembly (Burman, 2021) which could be subject to further testing.

Briefly, the distribution of topics by chapter, under each theme, were as follows:

(a) Values Clarification Theme: (a) *Kabanata 1* (Chapter 1) – *Pagpapakaedukado at Pagpapakabuti* (The Principles and Models of Being Educated and Being Good); and, (b) *Kabanata 2* (Chapter 2) – *Mga Pamamaraan sa Pagpapakabuti* (Approaches

to Goodness). (c) Values Analysis Theme: *Kabanata 3* (Chapter 3) – *Template ng Mapanimdim na Pagdedesisyon* (Template for Reflective Decision Making).

FINDINGS AND DISCUSSION

Significant Difference between the Pretest and Posttest Moral Reasoning Performances of High School Students before and after Exposure to the Values Education Courseware

Table 1
Pretest and Posttest Raw Scores of Groups by Rater

Student Groups	Student Output Scores From:									Ave. Pretest-Posttest Diff.
	Rater 1			Rater 2			Rater 3			
	Pretest	Posttest	Diff*	Pretest	Posttest	Diff*	Pretest	Posttest	Diff.*	
Group 1	80	65	-15	88	80	-8	88	95	7	-5.33
Group 2	80	75	-5	80	98	18	40	80	40	17.67
Group 3	40	65	25	70	98	28	43	83	40	31
Group 4	30	89	59	60	98	38	20	74	54	50.33
Group 5	30	68	38	65	98	33	20	96	76	49
Group 6	60	68	8	85	96	11	45	90	45	21.33
Group 7	60	75	15	90	80	-10	60	53	-7	-0.67
Group 8	80	68	-12	95	95	0	35	86	51	13
Group 9	80	75	-5	75	78	3	42	62	20	6
Group 10	95	65	-30	100	80	-20	79	91	12	-12.67
Group 11	85	73	-12	98	93	-5	25	100	75	19.33
Group 12	91	75	-16	96	96	0	60	94	34	6
Group 13	60	71	11	88	98	10	20	95	75	32
Group 14	30	82	52	60	96	36	18	76	58	48.67
Group 15	85	88	3	95	98	3	65	87	22	9.33
Group 16	85	65	-20	75	80	5	60	89	29	4.67
Group 17	60	60	0	70	91	21	60	62	2	7.67
Averages	**66.53**	**72.18**		**81.76**	**91.35**		**45.88**	**83.12**		
Overall Average Pretest Score									**64.72**	
Overall Average Posttest Score									**82.22**	

***Diff.= Difference = Posttest – Pretest** **Overall Average Posttest-Pretest Difference: 17.49**

There were significant differences between the pretest and posttest scores of at least two of the four raters' scores. Table 1 shows the raw scores given by the three raters on the pretest and posttest outputs of each of the seventeen (17) student groups in section 1 of grade 8. The difference between the pretest and

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posttest scores by student group under each rater was also computed. Thereafter the mean differences per student group by rater were calculated. Results indicated that the mean differences varied, ranging from 50.33 to -5.3. Overall average pretest and posttest difference figured to 17.49.

The computed t-test for the pretest and posttest scores (Table 2) of the three raters indicated a significant difference between students' moral reasoning scores (from at least two raters) before and after exposure to the courseware.

Table 2
Summary of t-test Results of the Three Raters

Description of Data Presented	RESULTS from each Rater		
	Rater 1	Rater 2	Rater 3
Average Mean Score Difference (per point)	5-6	9-10	37.24
t value	-0.920	-2.314	-5.940
Interpretation	Not significant	*SIGNIFICANT*	*SIGNIFICANT*

When the consistency in the ratings of evaluators was checked, it was only in the pretest when the results closely compared.

Table 3
Summary of the Kendall Tau Bivariate Comparisons for the Pretest

BIVARIATE COMPARISONS OF CONCORDANCE			
	RATER 1	RATER 2	RATER 3
RATER 1		0.692 *SIGNIFICANT* at 0.01	0.482 *SIGNIFICANT* at 0.05
RATER 2	0.692 *SIGNIFICANT* at 0.01		0.357 *SIGNIFICANT* at 0.01
RATER 3	0.482 *SIGNIFICANT* at 0.05	0.357 *SIGNIFICANT* at 0.01	

Table 3 summarizes the results of the Kendall Tau bivariate analysis of concordance for two raters at a time for the pretest. The Kendall W computation of concordance across all raters yielded a similar result. The computed X^2 value of $X^2 \geq 36$ with df=16 is greater than the critical value 32 at 99% confidence level (based on the table of Critical Values for Chi-square Distribution), indicating high consensus among the raters concerning the moral reasoning scores during the pretest. The posttest results elicited questions on factors that could have contributed to the discordance in the raters' scores for student groups' posttest performances. One issue cited was that the wide deviation in the posttest scores

vis-à-vis the pretest scores could confirm that the courseware indeed affected the students' performances.

One common observation is that student groups that used to be the lowest performers in the pretest ended up being the highest in percentage increases in scores in the posttest. One of the implications of this observation is that there could be factors, in addition to intelligence, that enabled the students to effectively use their moral reasoning abilities. One of these factors could be the affective faculty, which allows the person to empathize and/or sympathize, as Hoffman (in Straughan, 1990) suggested. This indicates the need to include everyday experiences in Filipino Values Education courseware if one agrees that the effect plays a vital role in evaluative problem (e.g., moral issue) solving. Another implication is that the different appeals used in instruction may have some roles in motivating students at different achievement levels. It may be a common notion that high achievers generally use their cognitive skills more than their affective skills in decision-making and vice versa for low achievers. Thus, since the courseware may be regarded as one employing a lot of affective and emotional appeals, such as the use of vicarious learning experiences in all chapters and the use of reflection and altruistic emotions as methodologies in problem solving, the resource may be more appealing, and, thus, more motivating to learners who generally employ more of their affective faculties than their cognitive abilities in solving problems. This inference is another subject of validation in future -studies on the same topic.

CONCLUSIONS AND RECOMMENDATIONS

Rightly, Brown (in Macleod & Tappolet, 2019) argues for the cultivation of intellectual virtues, habits, and dispositions, which are all competencies whose deployment will certainly increase the likelihood of problem solvers being able to address their concerns more effectively, especially in Values Education (Beale, 2019). This study responds to the weak emphasis on developing critical problem-solving competencies in Values Education not only in the Philippines but also in other parts of the world, as was reported in the research of Thornberg and Oóuz (2013). The present generation of young students lives in an era where access to information has developed at an unimaginably rapid pace. Nonetheless, such development by no means guarantees that every piece of information that young people could quickly retrieve, especially from cyberspace and other digital platforms or sources, is trustworthy. The ubiquitous warning against the proliferation of falsehoods and twisted truths in today's world has been vigilantly sustained in various educational venues. However, it is odd that even adults would

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continue to fall for pieces of information or their thoughts that they could have otherwise rejected had they subjected them to disciplined scrutiny or evaluation.

The findings in this study indicate that problem solvers who are wanting in competencies for critical problem solving could significantly sharpen their abilities for the said task given the proper method, tools, and training. At this juncture, it is expressly argued that critical thinking is a vital component of a good case of Values Education. This finds explicit support from Beale (September 2019), who maintained that teaching reflective thinking is a necessary condition of high-quality Values Education. Note that the substantive aptness of the courseware developed and used in this study resides in the contents determined by the intellectual values (e.g., analytic, reasoning, interpretive abilities) that are typically associated with values clarification and values analysis approaches to Values Education. This observation could further be deployed to support the view that Values Education can only heed the principle of spiral progression if it is mainly interested in teaching higher-order thinking for evaluative problem solving. While the same set of higher-order thinking skills may be taught from one level to the next higher stage of learning in Values Education, unlike the mere transmission of pre-selected moral values or doctrines, the learning of critical and reflective thinking, just like in Math and Science, could easily be crafted into a progressively more and more challenging intellectual activity in Values Education.

The functionality of lessons from this study may be tested on other existing coursewares, especially those in the formal and empirical sciences. For instance, the use of social learning environment in assessing and redesigning culturally sensitive and age-group-receptive material may be examined in the coursewares. Similar but age-appropriate Values Education courseware for other grade levels and college students should be developed to establish continuity in spirally progressive learning in Values Education.

The development of examination (paper-based or computer/internet-based) materials to test the moral reasoning skills of job applicants in both public and private offices may also be done in future investigations. A follow-up study must be conducted using a more quantitative and true experimental design with a bigger sample size with more expert evaluators of student performances. The role of specific features and appeals of the courseware to the learning process and in motivating learners and the conditions needed to maximize learning must also be investigated. A longer time of student exposure to the material in follow-up studies with true experimental design negotiated with host institutions for instrument validation is also suggested. Ongoing and enduring technical and financial linkages with the government, private sector, and civil advocates of

sustainable Values Education could be forged to strengthen a possible national program for values. If the use of courseware is institutionalized, performance standards employed in the monitoring and evaluation of public high schools in terms of learners' acquisition of moral reasoning skills must be developed. A new method of instruction for the Values Education course, i.e., treated not as a minor but a regular subject, just like Science and Mathematics, in the school curriculum, must be promoted by advocates of Values Education. Finally, teacher-users of educational technology must design and construct similar tools to augment existing instructional content and methodologies in Values Education.

Although the study provides significant insights, follow-up confirmatory studies with larger sample sizes across different regions to validate the courseware's effectiveness on a broader scale is highly recommended. A study on the long-term impact assessment of the courseware on students' moral reasoning and critical thinking skills is also suggested. It shall involve a longitudinal study of cohort groups to assess whether the observed improvements are sustained over time. The use of HTML5, WebGL, and WebAssembly in the new versions of the courseware may be explored. Other more popular platforms may also be tested. The application should have multi-platform accessibility like downloadable apps for mobile phone and other gadgets (laptop and tablets, etc.) aside from the browsers. All of these are often used by grade 8 students, the generation of learners referred to as the digital natives from the Generation Z or post-millennials.

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