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Development of outcomes-based instructional materials in professional teacher education courses for a flexible set-up

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Abstract

This study developed outcomes-based instructional materials in three professional teacher education courses based on an assessment of the different kinds of instructional materials used, their availability and frequency, challenges faced by faculty members and students in using the instructional materials and the perceived need to develop instructional materials. A descriptive research design was used to collect data while a developmental research design was applied for the development of outcomes-based instructional materials. The researchers constructed a questionnaire using a 4-point Likert scale. The online questionnaire was completed by 38 faculty members and 655 pre-service teachers from Batangas State University, Philippines. The data collected were analyzed using descriptive statistics and the Mann-Whitney U Test. The results showed that there are various instructional materials used in the three professional courses and they are used based on appropriateness and suitability. Both faculty members and pre-service teachers faced similar challenges in the utilization of these instructional materials as revealed by the Mann-Whitney U Test. These findings served as the basis for the development of three outcomes-based instructional materials that followed the sequence of activity, analysis, abstraction, and application. The instructional materials were subjected to evaluation and found satisfactory in content and format. Recommendations given were incorporated in the final copy.

Keywords: Flexible set-up, Instructional materials, Outcomes-based education, Pre-service teachers, Professional teacher education, Teacher education.

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Contents

Contribution of this paper to the literature

Research literature abounds on the use of instructional materials in basic education. This study assessed the utilization of instructional materials in three courses in a university setting that provided authentic information. The study does not only analyze data but used it in the development of outcomes-based instructional materials.

1. Introduction

Every educational institution aims to improve the quality of education provided to students. Many approaches have been developed from direct face-to-face classroom meetings up to the point where "no meetings" are required. Face-to-face classroom meetings are conducted in the physical classroom while "no meetings" are achieved through full virtual, flexible or modular set-ups.

Many educational institutions use the outcomes-based education (OBE) approach to provide quality education. This OBE approach entails establishing a clear image of what is required for students in schools to perform, then designing the program, teaching and evaluating it to ensure the acquisition of learning. The emphasis in an OBE approach is on measured outcomes rather than inputs (Glavin, 2018). It aims to define learning outcomes as the core of the learning process and create opportunities for students to accomplish the pre-determined learning outcomes.(Sainy, 2018). OBE research shows that it can enhance both teaching quality and student learning (Dai, Wei, Wang, & Wong, 2017; Macatangay et al., 2016) improves competency in knowledge acquisition (Tan, Chong, Subramaniam, & Wong, 2018) and communication skills (Zhang & Fan, 2020) and meet the students' need (An, 2014) although its implementation is not without challenges (Custodio, 2017; Katawazai, 2021; Yusof, Othman, Norwani, Ahmad, & Jalil, 2017).

The OBE approach was first used in the Philippines in 2012 by higher education institutions offering engineering programs. The policies, standards, and guidelines for the establishment of an OBE-system were outlined in the Commission on Higher Education Memorandum Order (CMO) 46 S Memorandum Order (CMO) No 37 S (2012). The Commission on Higher Education Memorandum Order further strengthened the implementation of OBE through CMO No. 46 series of 2012 that standardized the policy on outcomes-based and typology-based quality assurance in Philippine higher education. This paved the way for the educational shift to learning competency-based standards and outcomes-based systems wherein universities are required to provide comprehensive learning resources, so students will be able to investigate fundamental, advanced, and even cutting-edge knowledge in a variety of fields or professions.

Policies, standards and guidelines in teaching were also established by the Commission on Higher Education Memorandum Order (CMO) 46 S Memorandum Order (CMO) No. 74 S (2017) and No. 75 series of 2017. These memos prompted universities to reinforce the implementation of the OBE curriculum which should be learner-centered, inclusive, developmentally appropriate, relevant, responsive and research-based. The memos also specified new professional teacher courses in the curriculum, and included the foundation of special and inclusive education, building and enhancing new literacies across the curriculum and the teacher and the community, school culture and organizational leadership.

The addition of these new course to the curriculum as well as the transformation of the typology through outcomes-based education resulted several changes in the country's educational practices. To this effect, both the outcomes-based approach and the availability of instructional materials became major concerns.

As faculty members are beset with these problems, they must prioritize the urgency of demand and offer prompt and effective solutions to address this dilemma. Thus, the need to develop outcomes-based instructional materials in the new professional teacher education courses in the new curriculum. Literature shows the value of high-quality and appropriate instructional resources in teaching and learning which influences their effective use in the classroom (Abubakar, 2020). Further, instructional materials promote better academic performance in different courses (Ajoke, 2017; Bukoye, 2019; Edoho, Ebuara, Agbudu, & Inah, 2020; Galle, Agahu, & Riko, 2020).

In a nutshell, the researchers who are instructors or professors at education institution are convinced that developing outcomes-based education instructional materials for professional education courses is a critical tool for preparing competent pre-service teachers. These instructional materials are suitable for use in a flexible learning environment. Flexible learning refers to a range of educational ideas and systems aimed at giving students more options, convenience and personalization to suit their needs (Shurville et al. in Joan (2013)). Flexible learning allows students to choose where, when, and how they learn. Flexible learning approaches are frequently created using a variety of teaching and learning theories, philosophies and methodologies to allow students to have access to information and knowhow, offer thoughts and views, and share with other students and teachers. This can be accomplished using internet-based tools such as virtual learning environments or learning management systems, discussion boards, or chat rooms and it can also be accomplished through a "blended" approach with the topic at hand being addressed electronically and distantly in addition to "face-to-face" classroom situations and experiences (Joan, 2013).

Literature that is relevant to the current study was used to support this paper. To mention, faculty members manifest a great extent of understanding of OBE, primarily through the active participation of students in the learning activities (Guzman, Edaño, & Umayan, 2017). In OBE, faculty members presented a great deal of knowledge on the use of different techniques to assess student learning. OBE is being implemented in terms of practices, environment, objectives and performance-based assessment (Borsoto et al., 2014).

The development and use of instructional materials have advantages and disadvantages. One benefit is that it promotes student academic performance and learning (Adalikwu & Iorkpilgh, 2013; Prado, 2018). Disadvantages in the use of instructional materials were found in the study of Ominini and Jennifer (2019). Similarly, Wahyuningsih, Wahyono, and Nugroho (2021) identified three main problems that teachers face in developing learning resources, the technical ability to use tools and devices to create digital learning resources, the strategy of organizing learning materials to be applied to learning resources; and the lack of skills in managing learning materials to be applied to digital learning resources.

Some instructional materials were not effectively used due to a large number of learners per class, a lack of enough learning centers, and learners' confidence, a language barrier, teachers' negative attitudes, a lack of professional skills and domestic violence (Onditi, 2018) lack of funds for the purchase of instructional materials and time (Dhakal, 2017). Also, teachers' perceptions of teachers' guides, reference books, students' textbooks and reference books are inadequate (Dhakal, 2017).

This study investigated the types of instructional materials that are used, their availability and their challenges in professional education courses namely- foundation of special and inclusive education, building and enhancing new literacies across the curriculum, the teacher and the community, school culture and organizational leadership which led to development of instructional materials.

The purpose of this research paper is to address the lack of instructional materials which may enhance the needs of the teachers in the teaching- learning process. Instructional materials such as textbooks or modules are important for learners' experiences in schools. They serve as a map for learners to have a visual concept of what the curriculum looks like from the beginning until the conclusion of the subject. In this way, learners are guided throughout learning process. Given the educational and technological demands of new times, high quality developed textbooks are still relevant, important and indispensable to learners' education contrary to the idea that learning materials are becoming more electronic and digitalized.

2. Method

The study used a descriptive-developmental research design. For the descriptive design, a survey was conducted on the availability, utilization and challenges faced by the respondents in teaching and learning. The results of the need assessment became the basis for developing the instructional materials which utilized the developmental research design. After determining the needs, the topics were grouped based on the content designed for the whole semester. After designing the instructional materials, they were evaluated by faculty members teaching those courses. The corrections and suggestions of the evaluators were integrated into the instructional materials.

2.1. Survey Instrument and Data Gathering

The study used a survey questionnaire to assess the availability, utilization and challenges faced by the respondents in teaching and learning the 3 professional education courses. The questionnaire was developed by the researchers, deliberated over it and reviewed it. When they found it satisfactory, it was shown to other faculty members to validate the content.

The survey instrument has two parts. The first part is about the respondent's profile. The second part deals with the assessment of the availability and utilization of instructional materials and the challenges in teaching and learning the specified professional education courses.

A 4-point Likert scale was used to interpret the use of instructional materials with the weighted means of 1.00-1.50, 1.51-2.50, 2.51-3.50 and 3.51-4.00 verbally interpreted as "never, sometimes, often and always" respectively. For the challenges in the utilization of instructional materials, a 4-point Likert scale was also used. The weighted means obtained having values of 1.00-1.50, 1.51-2.50, 2.51-3.50, 3.51-4.00 were verbally interpreted as "strongly disagree", "disagree", "agree", and "strongly agree" respectively.

The survey instrument was made available through Google forms. Then, its link was sent to respondents. In this questionnaire, the respondents were requested to choose their answers from the enumerated instructional materials and use the Likert scales to weigh the frequency of their utilization as well as the challenges they encountered. The responses on the need to develop instructional materials were collected by asking respondents if there is a need to develop instructional materials in the three professional education courses. Then, they were asked to state the reason for the need and their responses were analyzed.

Monitoring and follow-up were made to collect the needed data. Then, the collected data was statistically treated with the use of frequency, percentage, weighted mean and ranking. A Mann-Whitney U test and a Z-test were also used to determine if there is a significant difference between the responses of instructors and students on challenges met in the use of instructional materials. These findings were then applied to the development of instructional materials.

2.2. Respondents of the Study

The respondents of the study were the instructors and the students at the College of Teacher Education from different campuses of Batangas State University, who had finished the courses on the three professional teacher education courses of foundation of special and inclusive education, building and enhancing new literacies across curriculum, the teacher and the community, school culture and organizational leadership. They selected random samplingc as a sampling technique. The link of the survey questionnaire was sent to 62 instructors and 1428 students. Out of this number, 693 respondents participated in the study which consisted of 38 instructors and 655 students.

Of the 38 instructors, 9 are males and 29 are females. Of the 655 students, there are 539 females and 116 males. There are 364 students belonging to the age bracket of 16-20 years old while 291 are aged 21-25. For instructors, their age ranges from 26 – 60 years old with the age bracket of 41-45 having the highest frequency of 9 followed by the age bracket of 26 – 30 with 8 and 36 – 40 with 6. With respect to educational background, 12 have a doctorate degree, 17 have a master's degree and 9 have a baccalaureate degree.

2.3. Ethical Concerns

All ethical concerns were addressed in the conduct of this research. Approval from the campus officials was obtained through the deans of the College of Teacher Education on each campus. An attestation letter was attached to the questionnaire to declare the respondents' participation, collection and processing of information for this research but their profile and personal information will not be shared with third parties following the

Philippines Data Policy Act of 2001. The respondents' privacy and confidentiality were assured and their participation in this study was entirely voluntary.

3. Results and Discussion

The results and discussion of the study are presented in the succeeding paragraphs and became the basis for the development of instructional materials.

3.1. Types of Instructional Material Available in Professional Education Courses

Generally, the responses of teachers and students indicate a wide range of available teaching materials for use in the three professional teacher education courses. Both teachers and students reported on sixteen instructional materials used in the instruction provided in these contents.

The top three instructional materials used by instructors are textbooks, computers and modules. Textbooks are the most important instructional materials used by instructors with 92.1% of faculty usage followed by computers with 86.8% and modules with 84.25%. Other instructional materials that follow in the ranking are eBooks and PDF, multimedia, video, slide, television, cellphones, software applications, handouts and study guides. Instructors indicated tablet, film and pamphlet as the least utilized instructional materials as confirmed by the frequencies of 8, 7 and 5 respectively.

For students, the top 3 instructional materials are modules, videos and eBooks and PDF. The frequency of the instructional materials is 552 (84.3%), 472 (72.1%) and 453(69.2%), respectively. The lowest rank belongs to pamphlets, tablets, and films with the frequency of 74 (11.3%), 108 (16.5%) and 145 (22.1%), respectively.

These findings are similar to those of the study by Aquino (2014) where it was found that faculty were using textbooks, PowerPoint presentations, workbooks, manuals and modules.

3.2. Utilization of Instructional Materials in the Three Professional Teacher Education Courses

The findings conclusively show there are various teaching materials available for instructors. The faculty disclosed that most of them are employed in the delivery of instruction which is confirmed by the students' responses.

All 38 instructors indicate that they have always used modules and computers as they are readily available to them, and they probably find them effective in terms of knowledge acquisition and can be a useful tool for teaching and learning basic physics.

Seven (7) instructional materials such as textbooks (3.35), slides (3.50), videos (2.95), multimedia (3.105), cellular phones (2.921), software applications (2.61) and eBooks and Portable Document Format (PDF) (2.92) are *often* used by the instructors while six were rated as *sometimes* pamphlets (1.632), hand-outs (2.37), study guides (2.289), television (2.03), tablets (1.19), and journals (2.42).

The students also acknowledge the variety of available instructional materials. Their assessment ranges between *"always", "often" and "sometimes"*. All the student-respondents, 655(100%) indicate that their instructors *always* used a study guide and module both got the same weighted mean of 3.583. This implies that the students were aware of the use of the aforementioned instructional materials.

Nine out of 16 instructional materials are *often* used. These are textbook (2.67), handout (2.81), slide (3.54), videos (3.14), multimedia (2.99), computers (2.94), cellular phone (3.28) which are sometimes used and includes pamphlets, films, television and tablets with weighted means of 1.67, 2.24, 2.05, and 1.986respectively.

This result contrasts with the findings of Bukoye (2019) who found that there is an inadequate use of instructional materials in most schools and that the majority of teachers do not take cognizance of the importance derived from the use of instructional materials while teaching.

3.3. Challenges in the Utilization of Instructional Materials

Cronbach's alpha coefficient was used to test for the reliability of the data obtained in this part of the study. Cronbach's alpha levels of 0.891048 for instructors and 0.98879 for students were computed and found acceptable.

Table 1. Challenges faced in the utilization of instructional materials

Challenges	Instructors (38)				Students (655)			
	A	SA	T	%	A	SA	T	%
1. Non-availability of support materials such as TV monitor, LCD projector in order to use the available instructional materials	14	4	28	47.4	304	75	379	57.9
2. Financial constraint	15	11	26	68.4	337	161	498	76.0
3. Lack of up-to-date instructional materials	17	13	30	79.9	295	59	354	54.0
4. Inadequate students' assessment opportunities	22	2	24	63.2	311	65	376	57.4
5. Lack of opportunities for learners to progress at their own pace	17	2	19	50.0	273	69	342	52.2
6. Limited number of instructional materials for professional education courses	18	6	24	63.2	334	71	405	61.8
7. Inadequate learning exercises and activities to achieve learning outcomes	16	4	20	52.6	266	49	315	48.1
8. Limited activities and exercises to prepare learners for future career	19	2	21	55.3	282	50	332	59.7
9. Content- based rather than outcomes-based	24	1	25	65.8	316	62	378	57.7
10. Lack of performance-based assessment activities	22	1	23	60.5	272	66	338	51.6
11. Lack of focus to recognize the diversity of learners	21	3	24	63.2	205	55	260	39.7

Note: A – Agree, SA – Strongly agree, T-Total, %-Percentage.

Table 1 shows the challenges faced by faculty and students regarding the use of instructional materials in the three professional teacher education courses.

Instructors are more concerned than students when it comes to the use of up-to-date instructional materials. This is supported by the fact that faculty regarded the lack of up-to-date instructional materials as the top major challenge with 13 of them strongly agreeing and 17 agreeing to this item (30 or 79.9%). In contrast, this is perceived as a problem only by 59 students who strongly agree and 295 who agree for a total of 354 or 54%.

The majority of faculty members are concerned about the assessment aspect of learning in the available instructional materials. There are 22 faculty members who agree and 2 who strongly agree (24 or 63%) that the instructional materials they use provide inadequate opportunities for students' assessment. Likewise, 22 faculty members agree and 1 strongly agree (23 or 61%) that the available instructional materials lack performance-based activities. Moreover, 16 faculty members agree and 4 strongly agree (20 or 53%) that there are inadequate learning exercises and activities in these materials to help students achieve the learning outcomes. Nineteen other faculty members also agree and two strongly agree (21 or 55%). There are limited activities and exercises in these instructional materials to prepare learners for a future career. In the case of students, they also identified these items on the assessment as challenges in their use of the available instructional materials. The percentages of students collectively agreeing and strongly agreeing to the 4 items on the assessment of learning are above 50%.

The table also indicates that 337 students agree and 161 strongly agree for a total of 498 or 76% that they experience financial constraint with respect to the use of these instructional materials. Students may have experienced this financial constraint as many of the books and instructional materials must be purchased so that they will have a personal copy. This must be true for the faculty members (26 or 68%) who mentioned financial constraint as a challenge. This finding is somewhat similar to the finding of Stein, Hart, Keaney, and White (2017) who uncovered students' experiences purchasing expensive textbooks that were rarely used.

Both faculty and students may have observed the inadequacy of instructional materials in these 3 professional education courses. They believe that there are a limited number of instructional materials for professional education courses as suggested by 24 or 63% of instructors and 405 or 62% of students who agree and strongly agree to this item.

Faculty and students are also concerned about the content of the available materials, preferring them to be outcomes-based despite the that they both observed the materials to be content- based. Outcomes-based instructional materials would be aligned with the outcomes-based curriculum being implemented (Tungpalan & Antalan, 2021). Additionally, the available instructional materials' content failed to integrate the diversity of learners into their approach. There are also inadequate opportunities for learners to progress at their own pace. This aspect of self-progression is deemed appropriate for university students by the faculty (Xiao, Kang, & Wang, 2019).

Lastly, both groups of respondents see the non-availability of support materials like television monitors and liquid crystal display (LCD) projectors to be able to use the available instructional materials as a setback. These responses of instructors and students were compared using the Mann-Whitney U test. The computed value is 49. The critical value of U at $p< 0.05$ which is 30, less than the computed value of 49. Z tests results indicate that the computed z-score of -0.72232 is greater than the p-value of 0.47152. This indicates that the instructors and students have the same responses to challenges in the use of instructional materials.

Apart from the challenges listed above, faculty also identified their hesitancy and time availability or constraints in reviewing books for recommendation to be used as textbooks or reference books as a problem. This could be a likely consequence of their hectic work schedule and family responsibilities. Furthermore, some of them do not have the confidence to operate Information Communication Technology (ICT) gadgets because they feel they lack the skills to use and operate them. They also added that they do not have the time to purchase instructional materials. This is probably a result of their school and residence being remote from bookstores and commercial areas where those instructional materials are sold.

Instructors' and students' assessments of the challenges in the utilization of instructional materials are comparable to the challenges presented by Chiamaka (2014) in her study. The researcher found that challenges include laziness of the teachers, a lack of skills and strategies for improvisation and use of instructional materials, financial constraints, a lack of appropriate materials in textbooks, time constraints, a lack of support from administration or authority and a lack of resource rooms. In addition, the findings of this research on the availability of varied instructional materials for professional education courses contradict Chimaka's finding that most teachers observed that schools do not have instructional materials.

3.4. The Need to Develop Instructional Materials

Generally, the majority believe that there is a need to develop instructional materials for the three professional education courses as asserted by 34 instructors and 596 students.

Instructors cited the following reasons for the need to develop instructional materials: the limited number of instructional resources for the new curriculum; support for quality instruction; and the need for supplementary materials.

In addition, developing instructional materials will contextualize the learning of the course in the Philippine setting, allowing students to be updated on the trends in their setting and therefore, enhance their expertise and familiarity.

The students believe that the instructional materials will enhance their knowledge, skills and abilities, serve as additional guides, provide support for flexible learning, provide additional learning experience, enhance teaching pedagogy, enhance learning motivation and help them overcome challenges in having meaningful and effective learning.

This finding bears some similarity with the findings of Las Johansen et al. (2017) who also found a need to develop instructional material in a course.

3.5. The Outcomes-Based Instructional Material in the three Professional Education Courses

The researchers designed an outcomes-based instructional material applying the 4As design of Activity, Analysis, Abstraction and Application based on their finding that there is a need to develop instructional materials in the three professional teacher education courses. This is in association with Padua (2012) who exposed that

the design of Outcomes-Based Education (OBE) learning materials should be anchored on the needs, interests, abilities, individual differences, experiences and background of the learners and should not include activities that pertain to routine tasks. The preparation also considered the syllabi used in the College of Teacher Education resulting in a total of eight chapters per module. They used many references and conducted brainstorming in the preparation of these instructional materials.

According to researchers, each chapter would have an introduction, intended learning objectives, activity, analysis, abstraction and assessment. It took 4 months for the instructional materials to be completed satisfactorily. The developed teaching materials were then subjected to evaluation and found to be satisfactory in content, instructional design and layout. The recommendations given were integrated to further improve the quality of these instructional materials and a final copy of each instructional material for three professional courses was prepared and printed.

4. Conclusion

The study concludes that there are varied instructional materials used in the professional teacher education courses such as modules, videos, eBooks and PDF, slides, computers, textbooks, cellular phones, hand-outs, software applications, multimedia, study guides, journals, television, films, tablets, and pamphlets. These instructional materials were used based on their appropriateness and suitability. Both the instructor and student respondents faced many challenges while using instructional materials based on the challenges confronted by instructors and students. The researchers developed instructional materials for the foundation of special and inclusive education, building and enhancing new literacies across the curriculum, the teacher and the community, school culture and organizational leadership which were found satisfactory.

5. Recommendations

The researchers recommend that the developed instructional materials be considered for use at the university. Moreover, the development of instructional materials should be further supported and continued as part of the functions of the university faculty. Administrators may provide training and workshops on instructional material development as well as incentives to encourage instructors to engage in this creative and scholarly pursuit.

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