Content Analysis of Independently Produced and DepEd Produced YouTube Videos for Teaching Measurement in Grade 7 Mathematics

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Abstract: Learning amidst the pandemic is more challenging now more than ever. Given the physical limitations of meeting in a classroom setup, students are utilizing technological tools to continue learning. The teaching process has also been challenged, and educators worldwide have already started making use of online videos to further learning. In this study, the content and quality of YouTube videos, both independently and DepEd produced, on Grade 7 measurement in a Filipino K-12 classroom were examined based on standards present in the mathematics framework for Philippine basic education set by the SEI-DOST & MATTED in 2011 and variables in the rubric developed by Morain and Swarts in 2012 for assessing instructional video. The study has shown that all videos evaluated show all aspects described in the Mathematics Framework for Philippine Basic Education that are used as content quality indications. However, independently produced videos had a higher content quality rating compared to DepEd-produced videos. Independently produced videos also outperformed DepEd-produced videos across all indicators for instructional design quality. This also holds true with independently produced videos' higher user ratings in terms of views and likes. Overall, the study revealed there is strong correlation between cognitive values and affective design, which is correlated with a video's number of engagements in terms of views.

Key Words: instructional Youtube videos; content quality; design quality

1. INTRODUCTION

The COVID-19 pandemic has affected everyone on a global scale. It threw regular schooling into disarray. Although physical school facilities were closed, education was still scheduled to continue. This led to a variety of means to continue the teaching-learning process, such as the use of modules and online tools. Zoom, Google Meet, Microsoft Teams, and Jamboard are just some of the more commonly used meeting and collaboration tools to have a semblance of regular classes. Different modalities were employed to move forward with education - online distance learning (ODL) and blended learning, to name a few.

One of the most-utilized platforms today in media-viewing is YouTube, a video-sharing online site that allows users to post, share, and organize their own videos (Ogirima et al., 2021). During the onset of the COVID-19 pandemic, Philippine's Department of Education (DepEd) released a memorandum that enjoins school nationwide to actively promote all official platforms of DepEd related to blended learning, one being DepEd's YouTube channel, where DepEd TV Episodes for all grade levels can be watched and downloaded (DepEd Memoranda 2020). Content and design quality analysis is therefore essential in examining content and quality of posted YouTube videos about measurement in a K-12 classroom based on standards set in place.

The instrumentation utilized was a researcher-developed codebook of variables counted during the coding process. The codebook guided the research in knowing the extent of alignment of selected YouTube videos regarding the concept of measurement for K-12 classrooms with standards present in the mathematics framework for Philippine basic education set by the SEI-DOST & MATHTED in 2011 and the

Morain and Swarts (2012) instructional video assessment rubric on instructional quality analysis. It also investigated if there is a significant difference between the content quality (CQ) and design quality (DQ) of DepEd-produced and independently produced Youtube videos regarding the concept of measurement for K-12 classrooms, as well as the relationship between the video user engagement (UE) and the content (CQ) and instructional design quality (DQ) ratings as a measure of the algorithmic aspect for self-directed learners.

This study is to be significant for stakeholders seeking to improve instruction on measurement. This includes, but is not exclusive, to teachers, practicum students, and tutors. The information gathered after examining the alignment of DepEd produced videos on YouTube may also be used to check the reliability and sufficiency of these tools. Those who have interest in teaching measurement can utilize this information to educate themselves and improve their instructional practices.

2. METHODOLOGY

2.1 Instruments

The researchers developed a codebook of variables based on standards present in the mathematics framework for Philippine basic education set by the SEI-DOST & MATHTED in 2011. The theoretical framework is a product of two years of intensive research led by Ateneo de Manila University, in collaboration with DOST-SEI and other higher education institutions such as Mirriam College and UP NISMED. The researchers also adapted the codebook of variables developed by Morain and Swarts in 2012. This particular codebook received near-perfect Krippendorf's alpha scores after two rounds of inter-coder reliability testing.

2.2 Procedure

Screening protocol. Screening for the videos began by looking up on the general YouTube search bar the term "measurement." Videos were scanned briefly to identify those targeted for Filipino Grade 7 K-12 classroom instruction. A total of six (6) videos found on December 29, 2021, were used for analysis. However, one video was removed for it exceeded the 40-minute period required for software coding analysis. YouTube videos used for this study were either independently produced or DepEd- produced.

Eight variables were recorded for each video, including: (1) video title, (2) length of the video, (3) author, (4) date uploaded by the creator, (5) URL link to video, (6) date located by researcher, (7) number of views, and (8) number of likes.

Coding process. The three researchers acted as primary coders. Aside from explicitly declared criteria per variable, the researchers also considered implicit aspects in scoring.

Using the first instrument, each video was analyzed for the presence or absence of instances from the content quality variables listed. If that variable was absent, it received a score of 0. If present, it received a score of 3, 2, or 1 to reflect relevant instances where the variable was demonstrated in the video, with three representing the most presence and one representing the least presence. For example, a video explicitly stating the objective of understanding, using, and interpreting readings from different instruments and measuring devices and no other objectives received a score of 1 for the "Mathematical Content - Measurement Objectives" variable. A video stating all three objectives from the variable received a score of 3. This three-point rubric is modeled after the Morain and Swarts instrument for assessing instructional video (2012).

The screened videos were also reviewed using Morain and Swarts' (2012) approach on evaluating instructional videos for the design quality criteria. The framework is divided into three sections, each having three goals. Each of the nine objectives has a minimum potential score of one out of three. Morain and Swarts (2012) established explicit criteria for assigning a score of 0, 1, 2, or 3 to a video for each variable. A score of three represents the best quality, two represents fair quality, 1 represents poor quality, and 0 represents absence of the variable. The design quality variables identified by Morain and Swarts (2012) as characteristics that make a good instructional video include audio, viewability, pacing, accuracy, organization, pertinence, confidence, self-efficacy, and engagement. For example, for the variable "timing", a score of 1 was given to a video that has been consistently too fast or too slow, therefore requiring pauses or fast forwards, 2 if the video has some parts that are overly fast or slow, and 3 if the video has conversational pacing.

3. RESULTS AND DISCUSSION

The first research question of the study was to determine to what extent the selected YouTube videos regarding measurement are aligned with the indicators described in the mathematics framework for Philippine basic education set by the SEI-DOST & MATHTED in 2011. Based on this framework, three categories are important for effective mathematics learning: 1) mathematical content with the specific topic objectives, 2) cognitive demands, and 3) cognitive values.

Table 1. Comparison of Content Quality of Independently produced and DepEd-produced YouTube Videos

Variable	Content Quality of Independently Produced YouTube Videos (N = 3)		Content Quality of DepEd-Produced YouTube Videos (N = 2)	
	M	*SD*	*M*	*SD*
Mathematical Content - Measurement Objectives	2.11	0.51	2.17	0.24
Cognitive Demands	2.67	0.58	2.17	0.71
Cognitive Values	2.33	0.33	1.67	0.00
Overall Content Quality Rating	2.37	0.32	2.00	0.16

Several differences were noted upon subsequent analysis of the data to compare the independently produced, and DepEd-produced Youtube videos. The overall content quality means rating for the independently produced videos was 0.37 points higher than DepEd-produced videos but still classified as moderate coverage of the different content quality indicators in the YouTube videos. Across the three variables, it was only in Mathematical Content - Measurement Objectives where DepEd-produced videos scored a little bit higher (M = 2.17, SD = 0.24). This means that in both sets of videos, the areas that are only moderately addressed are mathematical content and cognitive values. However, it is important to note that in the independently produced videos, the cognitive indicator demands have an extensive presence (M = 2.67, SD = 0.58). This means that the independently produced videos will most likely address this variable.

Table 2 displayed the results of the analysis of the data to compare the independently produced and DepEd-produced Youtube videos. The overall design quality mean rating for the independently produced videos (M = 2.74, SD = 0.16) is classified under high quality, whereas for DepEd-produced videos is classified as moderate quality (M = 2.28, SD = 0.03). Across the three categories and nine variables, the independently produced Youtube videos scored higher. The variables that got the highest ratings, a perfect score in fact, in the independently produced videos are timing and pertinence. Pertinence also got the highest mean rating in the DepEd-produced videos (M = 2.83, SD = 0.24). On the other hand, timing was among the variables that got the lowest mean score in the DepEd-produced videos, along with audio and engagement (M = 2.00, SD = 0.00). The lowest mean rating was received by the variable confidence in both independently produced (M = 2.33, SD = 0.33) and DepEd-produced (M = 1.83, SD = 0.24).

Table 2. Comparison of Design Quality of Independently Produced and DepEd-Produced YouTube Videos

Variable	Design Quality of Independently Produced (N = 3)		Design Quality of DepEd-Produced (N = 2)	
	M	*SD*	*M*	*SD*
Physical Design	2.85	0.17	2.22	0.00
Audio	2.67	0.33	2.00	0.00
Viewability	2.89	0.19	2.67	0.00
Timing	3.00	0.00	2.00	0.00
Cognitive Design	2.78	0.19	2.56	0.16
Accuracy	2.67	0.33	2.33	0.47
Organization	2.67	0.33	2.50	0.24
Pertinence	3.00	0.00	2.83	0.24
Affective Design	2.59	0.17	2.06	0.08
Confidence	2.33	0.33	1.83	0.24
Self-efficacy	2.78	0.38	2.33	0.47
Engagement	2.67	0.33	2.00	0.00
Overall Design Quality Rating	2.74	0.16	2.28	0.03

Table 3. T-test Comparison of Independently Produced (N = 3) and DepEd-Produced (N = 2) YouTube Videos on Content Quality, Design Quality, and User Ratings

Variable	Independently produced (N = 3)		DepEd-produced (N = 2)		*t*
	M	*SD*	*M*	*SD*	
1. Mathematical Content - Measurement Objectives	2.11	0.51	2.17	0.24	0.015 (p = 0.99)
2. Cognitive Demands	2.67	0.58	2.17	0.71	0.33 (p = 0.80)
3. Cognitive Values	2.33	0.33	1.67	0.00	3.00 (p = 0.21)
4. Physical Design	2.85	0.17	2.22	0.00	3.73 (p = 0.17)
5. Cognitive Design	2.78	0.19	2.56	0.16	1.00 (p = 0.50)
6. Affective Design	2.59	0.17	2.06	0.08	11.18 (p = 0.06)
7. CQ Rating	2.37	0.32	2.00	0.16	0.72 (p = 0.60)
8. DQ Rating	2.74	0.16	2.28	0.03	2.94 (p = 0.21)
9. Total Views	46429.50	43555.66	3983.50	1291.88	1.42 (p = 0.39)
10. Total Likes	992.50	1000.56	124.00	39.60	1.28 (p = 0.42)

The independently produced videos also received higher user ratings in terms of views and likes. The views of video one, produced by WOW Math, has more than 16 times the views of video 4, produced by DepEd TV Official. This means that it was able to maximize its popularity as an alternative source of information on learning measurement.

The physical design showed a variety of correlations with the three aspects of content quality. It has a negative correlation with mathematical content (r = -0.38), a weakly positive correlation with cognitive demands (r = 0.26), and a strongly positive correlation with cognitive values (r = 0.91). The cognitive design revealed negative correlations with mathematical content (r = -0.28) and cognitive demands (r = -0.42), but a moderately positive correlation with cognitive values (r = 0.51). The affective design revealed negative correlation with mathematical content (r = -0.40), weakly positive correlation with cognitive demands (r = 0.24), and moderately strong correlation with cognitive values (r = 0.70). No connections between these findings and literature can be established. The correlation between overall content and design quality ratings (r = 0.28) suggests an existence of a weak relationship between the two ratings for YouTube videos on measurement instruction. This could mean that a video with better design quality may not necessarily show better content quality.

4. CONCLUSIONS

Independently produced videos outperformed the DepEd-produced videos across all indicators. This is surprising because DepEd has the facilities and technologies available to produce quality instructional videos that are being used throughout online learning. The independently produced videos tend to put greater emphasis on cognitive demands, whereas the DepEd videos put less emphasis on cognitive values.

The independently produced videos gaining high ratings suggest that these creators know how to engage the viewers through excellent design. Other reasons could be an inherent passion for teaching through this medium or the goal of making these videos as a source of funds through YouTube's monetization feature. These videos are good supplementary materials, if not primary sources, of teaching the lesson measurement for Grade 7. Since most of the aspects are present, learners may opt to watch additional videos that may complement what was lacking in a previous video.

5. ACKNOWLEDGMENTS

N/A

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