

Flipped Classroom and Modular Instruction in Developing Analytical Skills

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Abstract

Transforming to a new normal delivery of education requires retooling of teacher's capability to engage with pedagogy suited to the recent trends of distant teaching-learning process. Featuring the characteristics of Flipped Classroom as utilized by some private institutions can be an effective strategy in public schools amidst pandemics. This study assumed that both flipped classroom and modular instruction are effective approach in teaching Science in the new educational set-up. It also ascertained the significant relationship between the performance of the pupils in grade three Science and the learning delivery modality both used in two identified schools. The Correlational design was used as method that measures a significant relationship between two variables without controlling both. There were 29 teachers and 158 learners as respondents' group selected through purposive sampling. The questionnaires were constructed through Google Survey Forms. It is a web-based application Docs using a survey administration software with high level of accuracy and consistency in gathering essential information. The findings showed that modular instruction was perceived as of greatest in use and flipping the class was of greater in use as teachers and students strived with the technical aspects. Furthermore, from the administered summative test with the six (6) identified competencies, the mean performance of Consolacion Central School learners was above average score brackets and Tayud Elementary School marked average score results. It was concluded that both learning delivery mode were effective as used by teachers in two identified schools. Using Chi-square of Relationship as statistical tool, it was also further concluded that there is no significant relationship between the performance of the learners and the learning delivery modality. However, both schools utilizing flipped classroom and modular instruction were effective despite of the challenges faced by teachers and learners after adjustments made. In the light of these findings, it is highly recommended to design an instructional training program that will develop the analytical skills in enhancing the performance of the learners and upgrade the delivery of instruction of distant teaching, acquire more skills in online educational tools, and direct the teachers in new normal pedagogical teaching.

Keywords: Development Education; Flipped Classroom and Modular Instruction in Science Teaching; Learning Delivery Modality; Correlational Research; Consolacion; Cebu; Philippines.

Introduction

There is always the greatest impact to student's learning upon using appropriate techniques and strategies in the biosphere of teaching science. Adopting the pedagogy in the new normal ensures the delivery of learning and increase student's performance as ailment of time has been challenged with health crisis.

The emergence of pandemic brought about by COVID-19 has placed countries under state of health emergency which restricts educational operation from face to face teaching-learning delivery. As

expressed by the Education Secretary Leonor Briones ensuring that the Department is one with President Rodrigo Roa Duterte in his non-negotiable commitment for the health and safety of the learners, teachers and staff but learning opportunities can still be provided without requiring them to go to school this time of a health situation.

The Department of Education conducted a survey on learning delivery mode preferences using the National Learner Enrolment and Survey Form (LESFs). The data show that modular distance learning as instruction has a percentage of 39.6% from the total respondents, 17.6 % blended learning instruction (which uses a combination of different modalities), 17.1% for online learning instruction and the rest for TV-based and radio-based learning instruction of this school year. Modular Instruction is the most preferred learning delivery mode which can be printed (hard copy) or digitalized form (soft copy).

Addressing to the result of the survey, the Department of Education (DepEd) take steps in transforming new normal delivery using varied delivery modalities, distance learning strategies for instructions, provides different platforms as determined in the Learning Continuity Plan (LCP). With this setting, teachers also need to undertake major adjustments in their strategies, techniques, learning tools that are aligned to the existing modality for effective instruction. Such adjustments anchor on the existing need of the learner's condition, preference and Department's identified learning delivery mode such as Distance Learning, Blended Learning and Homeschooling.

The most preferred delivery mode is Distance Learning which includes Modular (hard and soft), Online Distance Learning (ODL) and TV/ Radio-Based Instruction. Among three composition of Distance Learning, Modular and Online instruction are identified preferences of students and parents.

Modular instruction is an alternative instructional design for distance learning that uses developed instructional materials which are based on the needs of the students and based on the most essential learning competencies. Learners are encouraged to work on various activities that facilitate independent study. Modular as an approach, situates Filipino learners to learn comfortably at home. This instruction facilitates learners through the help of parents or guardian as describe with less contact to teachers. It is considered as learner's model or the "More Knowledgeable Other" wherein students may or may not learn but will learn

better with an MKO. In the delivery of this materials, parents may retrieve the hard copy or may access on digital or soft copy. Parents or Guardians have a significant role in facilitating this instruction.

In the delivery of the online modality, many social media sites, tools, virtual classrooms which are selected which support learning instruction such as; Google class room, Facebook page room, Messenger, YouTube live streaming, Microsoft Stream, Kahoot, to stream the process of sharing, interaction and teaching-learning process.

On the other hand, one of the distance learning approaches that this present study would like to undertake is the utilization of flipped classroom. It is a type of blended learning and instructional strategy which introduce the content at home through different social sites and practice working in school aiming to increase student learning engagement. This is a reverse of the usual or typical practice of introducing new content at school because student work on task at school and at home content is delivered using social media sites for instruction. The levels of learning and skills training is based on Bloom's Taxonomy but a reverse one enhancing the basic knowledge (remembering and understanding) at school and working on the problems and activities at home.

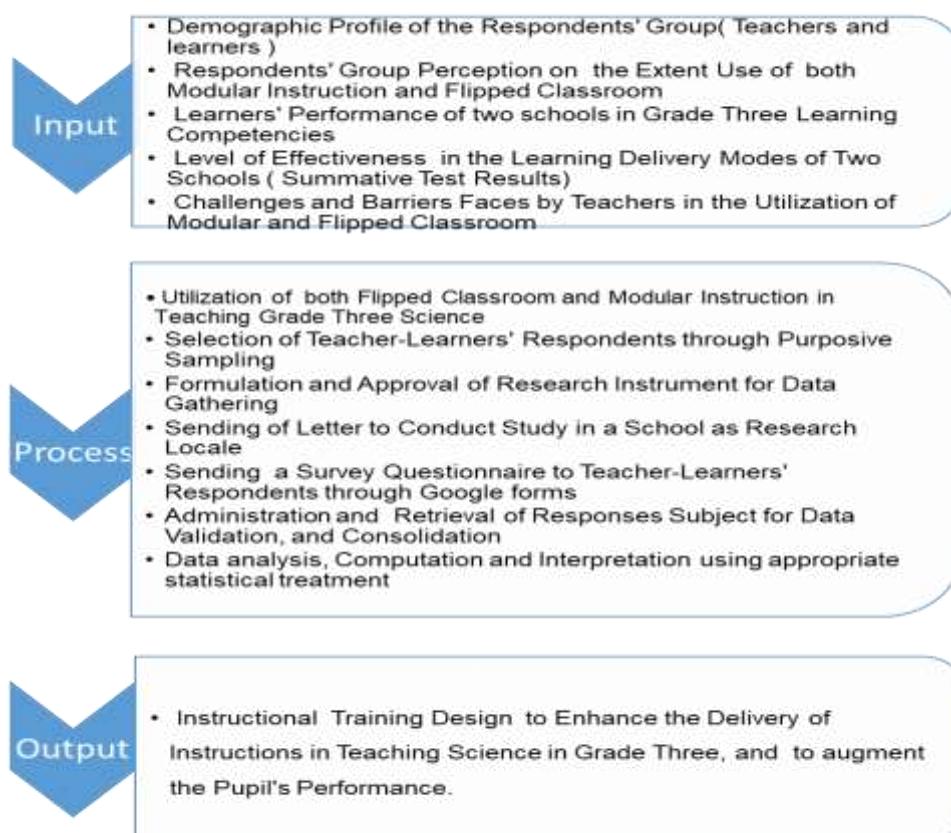
With this flipped model, students are now able to access the content anytime more advantageous because the content of the video format can be stopped, paused, played, etc. Students can write down questions about the content at home then making them ready to raise it to the teacher. The prior knowledge of the students is strengthened as they work independently highlighting the constructivism principles or theory. Behavior is also enhanced and formed as they response to the stimulus sequence or pattern which is the key element of understanding behavior. Most likely in the Philippine educational settings, teachers manage the class with full authority, plan and set classes according to their own pace and preferences though the function of the teacher is to facilitate learning. In

class settings, the number of populations is beyond limits resulting to concern unattended or not catered for some students. Unlike, in Flipped class, student-centered are evidently observed. It is real that some students learn fast than others. Flipping the classroom allows teacher to personalize learning. With the flip model students are comfortable as they usually access knowledge from their phones and computers.

Either Flipped Classroom and Modular approach or a combination of both have positive contribution to student's learning outcomes and performance as these feature student-centered, students learn in their own style, and student becomes independent learners and have the ability to move at their own pace, etc. It is in this context that the present research is pursued to analyze both learning delivery modes to find out its effectiveness as approach or instruction towards student's learning outcomes and performance in Science.

Materials and Methods:

This study used the Correlational design that measures a significant relationship between two variables without controlling both and find out if there are sort of change. This research aimed to establish the effectiveness of both flipped classroom and modular instruction in teaching grade three Science of the identified learning competencies. This also determined the cause- and- effect of the relationship between an independent (flipped classroom and modular instruction in two schools) to dependent variables (student's performance). In the selection of the respondents, the researcher used purposive sampling to determine the sample group. The basis for the way of selecting the respondents were those exposed already on the identified approaches under study. The researcher had already the knowledge of what school used the identified modality from where the respondents belong.



The researcher often did not have a control over the treatment, but instead pre-existing groups that received different treatment of instructions. The groups were considered as non-random, they differ in the delivery of instruction and educational venue, but they were similar in level and subject. The strength of this type of design valued the ethical or practical reason in conducting the study.

Table 1
Sample Population of Grade 3 Respondents from Consolacion Central School and Tayud Elementary School under Study
(Purposive Sampling)

Schools and Learning Delivery Modality	Grade 3 Respondents			
	Male	Female	total	%
<u>Consolacion Central School</u> (Flipped Classroom and Modular Instruction)	46	42	88	55.70%
<u>Tayud Elementary School</u> (Flipped Classroom and Modular Instruction)	30	40	70	44.30%
Total			158	100%

The researcher used Google Form as a tool in gathering information. Google Forms is a web-based survey or administration software applied to create forms for data collection purposes. It allows collecting information from users through surveys which provides a multiple method in collecting data. This had been shared to respondents by sending link. The collected information automatically entered to a spreadsheet. Considering that the information gathered was treated with appropriate statistical tools, the questions were set in standard. It was reviewed, finalized with the guidance of the adviser and statistician. It was sent to the pupils through sending links to any of the web portals such as messenger, email etc. The Google -Survey Form composed of structured questions which comprised; Part I- Demographic Profile of Teachers and Pupils, Part II- Respondent's Perception on Extent Use of Learning Delivery Mode , Part III- Level of Effectiveness of Flipped Classroom and Modular Instruction and Part IV- Major Challenges and Barriers Encountered in facing the type of instruction.

The researcher constructed a letter of intent to the Superintendent/ Supervisor and Principal where the locale belongs to their jurisdiction for approval to collect data from the respondents. Letter was sent to the teachers informing them to their participation on the study as they were qualified to be part upon using the approach in handling the pupils. The parent of the pupils received letter asking for permission to allow their respective son and daughter in the said undertakings. After the approval, link was sent to their respective media account to answer the Google Survey Form. With ample time, data were retrieved through sending back the responses and undergo validation, and consolidation for proper presentation of data.

The researcher also collected the scores from the summative test containing the science competencies. The scores were transmuted converting to grades which were bracketed into categorical descriptive ratings (Above Average, Average and Below Average).

This study utilized the scaling to measures the respondent's perception on extent use of both modular instruction and flipped classroom as learning delivery modes and indicating the level of effectiveness of the type of instruction.

To scale the pupil's performance in Science, three numerical brackets of scores for 3 levels of descriptive ratings were used from the Summative Test results in Science based on six competencies.

Range	Descriptive Ratings
23-32	Above Average
12-22	Average
1-11	Below Average

To scale the respondent's perception on the extent use of learning delivery mode in Flipped Classroom and Modular Instruction and encountered challenges: Numerical range of cut-off scores for five levels of descriptive ratings:

Scaling Distribution for Respondent's Perception on the Extent Use

Range	Scale	Levels	Descriptive Equivalent
4.21-5.0	5	Greatest of Extent of Use	If perceived that indicators are of greatest use in the teaching -learning process
3.41-4.20	4	Greater of Extent Use	If perceived that indicators are of greater use in teaching- learning process
2.61- 3.40	3	Neutral of Use	If perceived that indicators are neutral
1.81-2.60	2	Some Extent Use	If perceived that indicators are of sometime use in teaching- learning process
1.0-1.80	1	Not at All	if perceived that determinants are not of use in teaching- learning process

Scaling Distribution for Respondent's Encountered Challenges

Range	Scale	Levels	Descriptive Equivalent
3.26-4.00	4	Strongly Agree	If the challenges statement was very highly observed and experienced
2.51-4.25	3	Agree	If the challenges statement was highly observed, and experienced
1.76-2.50	3	Disagree	If the challenges statement was not observed, and experienced
1.0-1.75	1	Strongly Disagree	If the challenges statement was surely not observed, and experienced

To determine the level of perceptions of the extent use and encountered challenges of the respondents, the weighted mean was used.

Discussion:

This study analyzed the status of flipped classroom and modular instruction both utilized in developing grade three analytical skills profile at identified locale in Consolacion Central School and Tayud Elementary School in teaching Science.

It also ascertained the significant relationship between the performance of the pupils in grade three Science and the learning delivery modality both used in two identified schools. This study also described the teacher's challenges and barriers faced in the utilization of the preferred modality. The main goal of this research is to design an action plan that will enhance the skill of the learners and upgrade the pedagogical ability of the teachers suited to the new normal.

The areas to be answered includes the following: the demographic profile of the respondents, the perceived extent use of both flipped classroom and modular instruction, the performance of the learners in six identified competencies in Grade three Science, the level of effectiveness of learning delivery modes utilized in two schools, the relationship between the learners' performance and utilized learning delivery modality and challenges faced by teacher-respondents in the new normal situation. The method used in this study was correlational design to determine the direction of relationship between variables. The questionnaires were constructed through Google Survey Forms.

The respondents were selected through purposive sampling as a source of data. The administered summative test and Form XIV with the raw scores from two schools was made use to determine the academic performance of the students in grade three Science and level of effectiveness of the modality used. After the administration of Google Survey Form and the gathering of data, statistical tools were used to compute the value, analyze, and interpret using Chi-square of Relationship to test the significant relationship between the performance of the learners and the learning delivery modality used in both

schools. The weighted mean was also used to get the descriptive value in different indicators and determinants of this study. To get the value of mean performance, measures of central tendency were utilized.

The following findings were revealed based on the results of the data that were gathered, presented, interpreted, analyzed, and treated statistically.

- Respondent's Profile

There were two respondent's group: the teacher and learners in grade three elementary level. There were 29 teachers, all of them are female with the mean age of 41.10. Out of 29, twenty-one of them are married which is 72.4% of the total respondents. The highest educational attainment of the respondents is doctor's degree and majority of them gained their Bachelor' Degree which is 58.60%. Eighteen of them have rendered years of service six years and above who can be considered as seasoned teachers. All of them were only trained in the local level. The learner-respondents composed of 158, 76 were male and 82 were female who are in grade three level. Out of 76 male, sixty- eight of them are with the age bracket of 8 to 9 years old which is 89.47% and 72 females out of eighty- two are with the same age bracket which means that they are of appropriate age in the grade three level. Fifty percent of them got above average and the other half got average from their previous grade level, which means the learners were intellectually competent.

Teacher's Perception on the Extent Use of Modular Instruction and Flipped Classroom

- The findings related to the modular instruction such as hard copy and soft copy revealed that:
- The hard copy of modular instruction was considered as of greatest in use as perceived by the teachers with an average weighted mean of 4.51 while soft copy as modular delivery of instruction was of greater in use in the new normal.
- The findings related to the flipped classroom using the online instructional tool such as: computer screen recording, YouTube videos, Kahoot and Ed puzzle as perceived by teacher revealed as greater of extent use for those persistently using it and not at all for those striving of using those online instructional tool which marked a descriptive rating of average weighted mean as neutral or fairly of extent use in teaching-learning process.

Over-all, hard copy modular instructions were of greatest use in distant teaching-learning processes as it does not require skills related to digital and software applications compared to flipping the classroom. Flipping Classroom can be more effective if teachers are equipped and persistently using it.

- Learners' Performance in Grade Three Science Competencies Using Both Flipped Classroom and Modular Instruction

The findings revealed that, the learners' performance in grade three Science in Consolacion Central School was 22.54 mean score with a categorical bracket of Above Average, while in Tayud Elementary School was 22.27 which belongs to Average Categorical Bracket. Two schools resulted with a difference mean score of 0.27. The performance of learners using both flipped approach and modular instruction with the identified competencies were Above Average and Average performance.

- Level of Effectiveness

The findings revealed that the level of effectiveness utilizing both flipped classroom and modular instruction in Consolacion Central School was effective with 54.54% got passing score in summative test and it was also effective in Tayud Elementary School with 52.86% got a passing score in the given test. Based on the percentage of learner's passing score, Consolacion Central School got 1.68 % higher than Tayud Elementary School.

- Learners' Performance and Schools' Utilized Modality

The findings revealed that the relationship between the performance of the learners and learning delivery modality used has no significant relationship. Based on the Chi-square of Relationship as a statistical tool, the computed value was 0.27 which comparatively less than the tabled value at .05 level df;

5.991. Therefore, the decision was to accept the null hypothesis, that there is no significant relationship between the learner's performance and the learning delivery modality used in two schools.

- Teacher's challenges and barriers faced in modular instruction

Based on the responses, findings revealed that teachers faced very vigorous challenges in the delivery of modular instruction with the average weighted mean of 3.53 that has a descriptive equivalent of Strongly Agree affirming that they have experienced the indicated descriptors. The over-all observation and experienced by teachers significantly marked a strong level of challenges and concern that need to be addressed to ensure the physical and mental health in good condition.

Based on the related findings revealed the challenges of teachers in the delivery of modular instruction from different countries.

Conclusions:

Based on the findings of the study, it is concluded that both learning delivery mode were effective as used by grade three teachers in Consolacion Central School and Tayud Elementary in teaching grade three Science of the identified competencies. As statistically treated, it can be concluded also that there is no significant relationship between the performance of the learners and the utilized learning delivery modality in two schools. Furthermore, the challenges and barriers faced by teachers was very extensive with the general average weighted mean of 3.57 with a descriptive rating of strongly agree. Indeed, regardless of the challenges and barriers faced by the respondent's group, adjustments have made, and learning has taken place as it continuously addressing the gap in the new normal situation. In the light of the revealed findings of the study, it is highly recommended to design an instructional training program that will develop the analytical skills in enhancing the performance of the learners, enhance the delivery of instruction of distant teaching in Grade Three Science, acquire more skills in online educational tools, and direct the teachers in new normal pedagogical teaching.

References:

- Abante, A.S. et al. (2021). A Comparative Analysis on the Challenges of Online Learning Modality and Modular Learning Modality: A Basis for Training Program. *International Journal of Multidisciplinary Research and Analysis*, 2643-9875.
- Ahmed, M., et. al. (2020). Investigating cognitive holding power and equity in the flipped classroom. *Heliyon*, 6(8), e04672.
- Akçayır, G. & Murat, A. (2018). The flipped classroom: A review of its advantages and challenges. *Computers & Education*, S0360131518302045.
- Al-Okaily, M., et.al. (2020). Dataset on the Acceptance of e-learning System among Universities Students' under the COVID-19 Pandemic Conditions. *Data in Brief*, 106176.
- Alsmadi, M.K. et al. (2021). Digitalization of Learning in Saudi Arabia during the COVID-19 outbreak: A survey. *Informatics in Medicine Unlocked* 100632.
- Castroverde, F. & Acala, M. (2021). Modular distance learning modality: Challenges of teachers in teaching amid the Covid-19 pandemic. *International Journal of Research Studies in Education*, 2243-7711.
- Costa, R. D., Souza, G. F., Valentim, R. A. M., & Castro, T. B. (2020). The Theory of Learning Styles Applied to Distance Learning. *Cognitive Systems Research*.
- Culatta, R. (2020). *Conditions of Learning* (Robert Gagne).

- <https://www.instructionaldesign.org/theories/conditions-learning>.
- Dangle, Y.R. P & Sumaoang, J.D. (2020). The Implementation of Modular Learning in the Philippine Secondary Public Schools. 3rd International Conference on Advance Research in Teaching and Education.
- Elfeky, A. I. M., Masadeh, T. S. Y., & Elbyaly, M. Y. H. (2019). Advance Organizers in Flipped Classroom via E-learning Management System and the Promotion of Integrated Science Process Skills. Thinking Skills and Creativity, 100622.
- Gandolfi, E. et al. (2021). A new educational normal an intersectionality-led exploration of education learning technologies, and diversity during COVID-19. Technology in Society, 101637.
- Garcia-Ponce, E.E. & Mora-Pablo, I.M. (2020). Challenges of Using a Blended Learning Approach: A Flipped Classroom in an English Teacher Education Program in Mexico. Higher Learning Research Communication, 347802074.
- Hamalainen, R. et al. (2021). Understanding teaching professionals' digital competence: What do PIAAC and TALIS reveal about technology-related skills, attitudes, and knowledge? Computers in Human Behavior, 117, 106672.
- Hew, K. et al. (2020). Transitioning to the "new normal" of learning in unpredictable times: pedagogical practices and learning performance in fully online flipped classrooms. International Journal of Educational Technology in Higher Education, volume 17, Article 57.
- Hoshang, S., Hilal, T.A., & Hilal, H.A. (2021). Investigating the Acceptance of Flipped Classroom and Suggested Recommendations. Procedia Computer Science 184 (2021) 411–418.
- Iivari, N., Sharma, S., & Ventä-Olkkonen, L. (2020). Digital transformation of everyday life – How COVID-19 pandemic transformed the basic education of the young generation and why information management research should care? International Journal of Information Management, 102183.
- Kapasias, N., et.al. (2020). Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India. Children and Youth Services Review, 105194.
- Kim, D., et. al. (2020). Exploring student and teacher usage patterns associated with student attrition in an open educational resource-supported online learning platform. Computers & Education, 103961.
- Kirsch, C. et al. (2021). Practices and Experiences of distant education during the COVID-19 pandemic: the perspective of six-to sixteen-year-olds from three high-income countries. International Journal of Educational Research Open, 100049.
- Lapitan, L.DS.et al.(2021). An effective blended online teaching and learning strategy during the COVID-19 pandemic. Education for Chemical Engineers, 116-131.
- Lemay, D.J. et al. (2021). Transition to online learning during the COVID-19 pandemic. Computer in Human Behavior Reports, 100130.
- Limperos, A. M., Buckner, M. M., Kaufmann, R., & Frisby, B. N. (2015). Online teaching and technological affordances: An experimental investigation into the impact of modality and clarity on perceived and actual learning. Computers & Education, 83, 19.
- Llego, M. A. (2020). Buhay Guro. DepEd Learning Delivery Modalities for

- School Year 2020-2021. <https://www.teacherph.com/depd-learning-delivery-modalities/>
- Magsambol, B. (2020). FAST FACTS: DepEd's Modular Learning. How does DepEd's Modular Learning Works? <https://www.rappler.com/newsbreak/iq/things-to-know-deped-modular-learning>.
- Martin, F. & Bolliger, D.U. (2018). Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment. *Online Learning*, 22(1), 205222.
- Mayer, R. E. (2019). Where Is the Learning in Mobile Technologies for Learning? *Contemporary Educational Psychology*, 101824.
- Muller, C. & Mildenerger, T. (2021). Facilitating flexible learning by replacing classroom time with an online learning environment: A systematic review of blended learning in higher education. *Educational Research Review*, 100394.
- Orhan Göksün, D., & Gürsoy, G. (2019). Comparing success and engagement in gamified learning experiences via Kahoot and Quizizz. *Computers & Education*.
- Puteh, M., et.al. (2018). Learning Approaches and Academic Performance. *The Journal of Social Sciences Research*. 746-752. 10.32861/jssr.spi6.746.752.
- Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2019). Challenges in the online component of blended learning: A systematic review. *Computers & Education*, 103701.
- Sadiq, S. & Zamir, S. (2014). Effectiveness of Modular Approach in Teaching at University Level. *Journal of Education and Practice*, 2222-288x.
- Saha, A. et al., (2021). The mental impact of digital divide due to COVID-19 pandemic induced emergency online learning at undergraduate level: Evidence from undergraduate students from Dhaka City. *Journal of Affective Disorders*, 294, 170-179.
- Sajid, M., et.al. (2016). Can blended learning and the flipped classroom improve student learning and satisfaction in Saudi Arabia? *International Journal of Medical Education*, 7(1), 281-285.
- Sanchez, E., & Garcia, R.H. (2008). The use of modality in the design of verbal aids in computer-based learning environments. *Interacting with Computers*, 20(6), 545-561.
- Schubert, C. et.al (2014) Understanding Modular Learning - Developing a Strategic Plan to embrace change. <https://files.eric.ed.gov/fulltext/EJ1097629.pdf>.
- Serkan, F & Serdar, F. (2020). Flipped Classroom Implementation in Science Teaching. https://www.researchgate.net/publication/341398993_Flipped_Classroom-Implementation_in_Science_Teaching.
- Tsai, M.-N., Liao, Y.-F., Chang, Y.-L., & Chen, H.-C. (2020). A brainstorming flipped classroom approach for improving students' learning performance, motivation, teacher-student interaction and creativity in a civics education class. *Thinking Skills and Creativity*, 100747.
- Van Alten, D. C. D., Phielix, C., Janssen, J., & Kester, L. (2020). Self-regulated learning support in flipped learning videos enhances learning outcomes. *Computers & Education*, 158, 104000.
- Wang, A.I. & Tahir, R. (2020). The effect of using Kahoot for learning: A literature review. *Computer & Education*, 103818.

- Webel, C., Sheffel, C., & Conner, K. A. (2018). Flipping instruction in a fifth grade class: A case of an elementary mathematics specialist. *Teaching and Teacher Education*, 71, 271–282.
- Yıldırım, F.S & Say, S. (2020). Flipped Classroom Implementation in Science Teaching. *International Online Journal of Education and Teaching (IOJET)*, 7(2), 606-620.