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FROM ROTE LEARNING TO ACTIVE ENGAGEMENT: A CASE STUDY OF USING CROSSWORD PUZZLES TO IMPROVE LEARNING OUTCOMES IN COMMERCE EDUCATION.

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ABSTRACT
Rote Learning and Grades on Report cards have been defining the Indian Education system since the British era. The focus has always been on marks scored at the semester/end examination. Though continuous assessment has been part of policies but remains on paper. The diverse form of formative assessment exists only in primary school, as we move ahead to secondary and higher education, the assessment tends to be standardized. After half a century, the National Education Policy envisages moving towards the holistic development of learners and calls upon a teaching-learning system that lays its foundation on principles of Universal Design for learning. The present study thereby attempts to explore the understated form of formative assessment i.e. crossword puzzle as an assessment tool to actively engage students, nurture critical thinking, and enhance learning outcomes. It experiments with the Commerce students of grade XIIth to evaluate its impact.

The research concludes that crossword puzzles offer a valuable assessment method, promoting deeper understanding, and engagement and fostering 21st-century skills crucial for future success amongst learners.

Keywords: Crossword Puzzles, Formative Assessment, Cognitive Skills, Affective Skills, Commerce Education, Active Learning, National Education Policy (NEP) 2020

INTRODUCTION

The core of the NEP 2020, rests on the holistic development of learners while working on the principles of Universal Design for Learning and not, the 'One Size Fits All" paradigm. The NEP 2020 urges every teacher to be responsive towards the changing dynamics of learners i.e. Generation Y to Generation Z and now Generation Alpha. Comprehending the subtle distinctions within the policy, the Act highlights the responsibility of teachers, rather than administrators or affiliating bodies, in the processes of measuring, assessing, and evaluating a learner. The Act contemplates that assessment methods must incorporate diverse approaches to presenting information, allowing for adaptability and independence among learners. This goes beyond the conventional focus solely on evaluating learning outcomes in the form of summative examinations. It calls for significant change in the teaching-learning ecosystem with greater emphasis on assessment methods. The assessment methods need to be interactive, serving not only to gauge the learner's competencies but also to furnish the teacher with insights to shape their teaching methods. They are expected to go beyond academic knowledge and include assessing students' soft skills, critical thinking, problem-solving abilities, and creativity at all levels and not just at the school level.

It is a well-known fact that during the initial years of schooling i.e. up to the primary level, the evaluative methods focus on developing motor skills and cognitive skills but as we move to higher grades, the focus lies on percentage and report cards rather than skills. To fill this gap, the situation calls for a marked improvement with debates amongst the stakeholders to shift from standardized methods of assessing learners to more customized and flexible system of evaluating learners. The need for improvement in assessing the learner's abilities rather than turnout in the examination needs reconsideration. Especially after COVID 19 where the engagement levels of learners have received a severe blow.

Diving deep into the most popular forms of assessments that are largely categorized into formative and summative assessments. Formative tests are to be conducted all-round the year i.e continuously and are expected to serve as a feedback tool for improvement in learner performance. These formative assessments may be in the

form of quizzes, projects, objective type of questions, or homework assignments that help the assessor gauge the creative and problem-solving abilities of the learner. Summative assessments on the other hand are conducted at year/semester-end to measure the learning outcomes of the learner and provide a grade card wherein the learner transits from one level to another. The summative tests have been standardised mainly in India due to the huge number of learners enrolled, but formative tests that are to be customized for teacher–learners, still face a dearth of standardization.

The inclusion of crossword puzzles has a long history wherein Egyptians started playing crossword puzzles back in 300 AD, which used to help them channel the brain. Crosswords are still a part of widely played games through newspapers, quizzes, journals and in very few educational activities. Playing crosswords increases cognitive and problem-solving skills, reduces stress, and assists in learning a new language. Puzzles as learning tools have existed for 70 years since it was believed they are best for developing problem-solving skills and active learning. Crossword puzzles serve as a multifaceted tool for nurturing both cognitive and affective skills. They promote intellectual growth, offer emotional support, and provide learners with a satisfying blend of challenge and reward. Despite its potential, it remains underpinned and therefore this paper attempts to experiment inclusion of crossword puzzles as a form of formative assessment amongst Commerce Students enrolled under the Maharashtra State Board of Secondary and Higher Secondary Education, Pune. The primary objective is to evaluate the usefulness of the Crossword Puzzle as a learning tool and its acceptance by the students. As a versatile and accessible activity, crossword puzzles have the potential to make a significant and lasting impact on learners' overall development and hence to validate the stance amongst learners in junior college, the experiment is undertaken.

Background of the Research Study
Intentions: The present study envisages choosing crossword puzzles to ensure that learners are gauged through higher-order thinking skills and move towards active learning rather than focussing only on the memory skills of learners. Further post covid a triangulation of teachers, peers and learner discussion was augmented.

Where are we: Crossword puzzles have long been considered a popular and engaging form of word-based entertainment and mental exercise, but these puzzles as a form of formative assessment have been used at the primary or school level. As we go to the higher grades the focus shifts from ability enhancement to grade sheet. Hence teachers involved focus on the standardized form of assessment rather than including activities that focus on learning with fun. To fill in this gap and urge teachers to accept new modalities of assessing learners, the above objective is framed and experimented with. The prolonged periods of isolation and disrupted routines caused by the pandemic have underscored the need for engaging and effective ways to enhance cognitive and emotional well-being. Crossword puzzles, with their capacity to stimulate mental activity, foster vocabulary expansion, and provide a sense of accomplishment, offer a much-needed respite from the challenges of the pandemic era.

THEORETICAL BACKGROUND:
Formative assessment is a common term used in the teaching-learning ecosystem with a wide consortium of tools. The practices are diverse with different rationales for assessing the learner. Based on Paul Black and Dylan William (2009)," Developing the theory of formative assessment", the study out of varied formats of formative assessment, that uses a Crossword puzzle, the aspects of the study are tabulated below.

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Figure 1: Aspects of Formative Assessment

Actor	WHERE THE LEARNER IS GOING	WHERE THE LEARNER IS RIGHT NOW	HOW TO GET THERE
Teacher	1.Clarifying learning intentions and criteria for success	2. Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding	3. Providing feedback that moves learners forward
Peer	Understanding and sharing learning intentions and criteria for success	4. Activating students as instructional resources for one another	
Learner	Understanding learning intentions and criteria for success	5. Activating students as the owners of their learning	

Source: Black and William

RESEARCH OBJECTIVES AND HYPOTHESIS

R_{01}: To investigate and assess the impact of incorporating crosswords as an educational tool among learners

R_{H1}: The incorporation of crossword puzzle demonstrates a positive sentiment of use of crosswords amongst learners.

MATERIALS AND METHODS

Target Audience: To fulfil this objective, a crossword puzzle on the subject of economics was circulated amongst the learners in XII grade of Commerce Stream enrolled under the higher secondary school located in Palghar District of Maharashtra using convenient sampling.

A total of 160 students were involved in the experiment out of which 116 were processed for data analysis (response rate: 84.38%) using random sampling method.

The purpose of choosing commerce students was dual first commerce has formed one of the largest fraternities of learners in Maharashtra during the last 5 years and the process of teaching-learning and evaluation has been mechanical, especially post-COVID-19.

Research Ethics: The identity of learners and teachers has been coded following the principles of research ethics and integrity, however are validated to ensure apt results and conclusions.

Experiment: The students were handed over the crossword puzzle and were allotted 20 minutes to solve the same. The crossword was created using the puzzle maker tool by the researcher to avoid biases. The puzzle comprised 10 clues to be solved with a score of 1 each. The learners were self-assessed and asked to reflect on post-activity. After the test, both a semi structured questionnaire based on the 5 Likert Scale regarding the experience to be answered anonymously. The 5-point Likert scale was 1,2,3,4,5 was strongly disagreed, disagree, neutral, agree and strongly agree respectively.

The questions asked to assess the Cognitive and Affective Learning Skills were as below-

A. Cognitive Skills
1. The Crossword puzzles promote mental skill as well as attitude.

2. They are challenging and help improve concentration levels.

3. Use of crossword puzzles helps to avoid spelling errors

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4. Cheating while solving crossword puzzles is difficult.

B. Affective Skills

1. A sense of achievement was felt after completing the crossword puzzle

2. It was fun learning and an enjoyable way of being assessed.

3. Solving crossword puzzles was a waste of time.

4. The use of crossword puzzles acted as ice breaker and kept us engaged.

C. Write your overall experience of solving a crossword puzzle.

D. Discussion and short interviews were also taken from the teachers and students focussing on enjoyment of learning, improved concentration level and challenges involved.

Results and Discussion: The results and discussion section is categorized into two sub-sections:

A. Descriptive statistics (Percentages and Average Mean score) of Likert scale questions drawn from the questionnaire circulated amongst the learners. (Section A and B under Materials and Methods)

B. The analysis of open ended questions and feedback gathered in the form of interviews from learners. (Section C and D under Materials and Methods)

A-1 Total 116 responses of learners in the age group of 15-17 years enrolled in Std XII has been processed. The demographics display no significant differences.

The descriptive statistics are as below –

Table 1: Learners Responses representing the impact of crossword puzzle on their Cognitive Skills (N= 116)

Sr. No	Questions (Percentage)	Strongly disagree (1)	Disagree (2)	Somewhat Agree (3)	Agree (4)	Strongly Agree (5)	Average Mean Score
1.	Crossword puzzles promote mental skill as well as attitude.	8	9	24	55	20	3.57
2.	They are challenging and help improve concentration levels.	6	11	16	56	27	3.75
3.	Use of crossword puzzles helps to avoid spelling errors	8	7	23	46	32	3.72
4.	Cheating while solving crossword puzzles is difficult.	13	27	23	33	20	3.17

Source: Researcher's Compilation based on primary data

Table 1 revealed that the Average Mean Score of all questions asked were close to 4, which states (except Q No.4) which signifies that students strongly agree that crosswords puzzles help to improve cognitive development.

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Table 2: Learners Responses representing the impact of crossword puzzle on their Affective Skills (N= 116)

Sr. No	Questions (Percentage)	Strongly disagree (1)	Disagree (2)	Somewhat Agree (3)	Agree (4)	Strongly Agree (5)	Average Mean Score
1.	A sense of achievement was felt after completing the crossword puzzle	10	14	21	48	23	3.52
2.	It was fun learning and an enjoyable way of being assessed.	8	6	20	46	36	3.83
3.	Solving crossword puzzles was a waste of time. (Negative Statement)	25	41	14	26	10	3.39
4.	The use of crossword puzzles acted as an ice breaker and kept us engaged.	**6**	**14**	**30**	**42**	**24**	**3.55**

Source: *Researcher's Compilation based on primary data*

Table 2 revealed that all the questions have the value above < 4. Which signifies that learners enjoyed, engaged and achieved. Question 3 which has value 2.2 shows that students invested their time. This has increased affective skills.

Table 3: Sentiment Analysis

The feedback so collected in form of questions C and D were recorded and run through sentiment analysis using online tool. The analysis are as below:

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The impact was positive with a magnitude of 5.35.

CONCLUSION

The research demonstrates that crossword puzzles serve as a valuable formative assessment tool for XII grade commerce students, positively impacting both cognitive and affective skills. These puzzles enhance mental abilities, concentration, and spelling accuracy while fostering a sense of achievement, enjoyment, and engagement in the learning process. Embracing crossword puzzles aligns with the goals of the National Education Policy (NEP) 2020, promoting holistic development and active learning. Educators seeking innovative assessment methods to move beyond rote learning should consider the benefits of gamified assessments like crossword puzzles in enhancing the learning experience. Further research can explore their long-term effects across subjects and grade levels, but this study underscores their potential for fostering a more engaging and effective learning environment.

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