

CHAPTER 1

Brainwork

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INTRODUCTION

The essence of education constitutes the development of thinking skills in students. In that, students become active participants in the teaching-learning process, where they are not merely the receivers of information but also the investigators and creators. A functional learning environment therefore requires the educators to perform all such tasks within their capacity that instill in learners an unfeigned inclination towards research.

The term “**brainwork**” refers to the **accomplishment of a task through focused mental effort**. In a 21st century context where the need of creating thinking classrooms appears bigger and more urgent, the term has definitely come to occupy a place of prominence.

The present chapter comprehensively deals with the various niceties of the pedagogical tool viz. “brainwork”, which has been ideated, created & put into force by Chitkara International School, Chandigarh, India. Emanating from the need of encouraging learners to undertake in-depth analysis of information, the tool renders educators the opportunity to nurture critical and creative thinkers and simultaneously ensures their sound cognitive development.

THEORETICAL BACKGROUND

The gravest challenges of the former years in educational history include the unrestricted emphasis on rote-memorisation, where elevation of grades was ubiquitously sought, and enhancement of knowledge took a back seat. This is further indicative of the fact that the objectives of sound learning were unknown at large, and the processes that were designed to attain these unprofitable objectives varied greatly from the ideal ones.

Nonetheless, in the present world where mechanisms of doing the same things continue to change overnight, it becomes necessary to empower young

learners to adapt to these changes through sound learning and powerful research abilities. Correspondingly, the educator must actively communicate with children and help them undertake activities that necessitate them to “think”.

In a general sense, rendering pupils with things to “figure out” and making sure that it adds to the process of learning by evaluating children’s performances is the object of the classroom communication. An apparent behavioural change, irrespective of its extent, is invariably involved in the process of learning (Chitkara & Natarajan, 2015).

“Brainwork” serves as one of the most functional tools for instilling robust investigation skills in learners. While the modern-day schools strive to nurture successful professionals of Industry 4.0, the tool constitutes a sound mix of challenges and contexts that encourage children to enhance their investigational capabilities. The focus then lies on the augmentation of learners’ critical and creative thinking skills, which prepare students to face challenges or solve problems, especially with unfamiliar contexts.

LITERATURE REVIEW

For individuals who value learning, research-based activities are undoubtedly nifty. Some researchers indicate a harmonizing relationship between teaching and research (Neumann 1992; Braxton 1996; Sullivan 1996). For instance, Neumann (1992) identified beliefs about three levels of relationship that entailed “concrete” benefits – where researchers provide students with latest and advanced information – and “abstract” benefits – where researchers foster in students a critical and inquiring approach towards the process of gaining knowledge. The recording of approaches to research-led education in the form of illustrations and case studies has made for the creation of comprehensive frameworks that elucidate the outcomes and objectives of education (Jenkins, Healey & Zetter 2007). Furthermore, Healey (2005a) adds to the work of Griffiths (2004) with the aim of formulating the framework of educational programme which showcases differences in (i) the stress on research from the content to the process, and (ii) the instructional methods that move from being teacher-centred to student-centred, wherein learners pose respectively as listeners or participants.

In today’s world, the most important part of education is to educate learners of the ways of using thinking skills. These skills entail not just creativity ((Rhodes, 1961; Runco, 2014) but also problem-solving ability (Segal, Chipman & Glaser, 1985). Instructional programmes created for the educational sector, in fact, focus at one or the other type of thinking, or in the best scenario entail analogous educational activities that foster both types (critical and creative): no matter what, the instructional practice which fosters critical thinking is differentiated from the one that cultivates creativity (Hudgins & Edelman, 1986, Kagan,

1988, Nickerson, 1981, Yang & Lin, 2004). Having said that, through the past few years, it has become more and more perceptible that the differentiation between the different types of thinking viz. creative thinking and critical thinking is a systematically unnatural distinction (Marzano, 1998, Paul, 1993, Perkins, Jay & Tishman, 1993).

Correspondingly, integrated or comprehensive approaches of thinking have made for newer instructional programmes, which don't highlight the numerous functions of only one thinking type, but focus on learners' thinking holistically (Bleedorn, 1993, Perkins, Tishman, Ritchhart, Donis & Andrade, 2000, Sternberg, 1997).

Indeed, it remains one of the most prominent and crucial goals of the education sector to enhance the problem-solving skills and critical thinking of learners. As averred by Healey, learners are most likely to acquire the greatest depth of learning from research when they themselves undertake the research. Therefore, the need for research-based activities becomes significant, as these shall assist education in attaining its ideal objects, restore faith in public schools and in moral, democratic, and human values, help educators to teach for self-identity and individual realization and assist learners to adapt to cultural diversity. These would also help in the attainment of quality goals, cause alterations in racial attitudes, and would successfully meet the future world problems related to fast-paced technological and scientific advancements (Boykin, 1972).

EXPLANATION OF THE TOOL

Brainwork *per se* is a research-based approach to teaching and learning, under which a multi-disciplinary assignment is assigned to learners of primary to senior secondary classes (classes 1 to 12) on a bi-monthly basis. The assignment includes a mentally stimulating task, which aims at strengthening students' knowledge of various subjects and further encourages them to think creatively and critically.

This research work in turn assists the learner in comprehending a given concept or topic taught in the class. It entails activities that have less of paperwork and a lot of cognitive work, analysis, surveys, and employment of concept. (Kapoor, 2014)

Some of the definitions of brainwork include:

1. Brainwork is a research-based assignment which is prepared by the subject teachers to be assigned to the learners of the primary, secondary and senior secondary level, on a bi-monthly basis, with the object of ensuring multi-disciplinary and self-directed learning.
2. Brainwork is simply the key for unlocking the best way of learning through

research-based tasks and activities. It focuses on enhancing the critical thinking, creativity, and problem-solving skills of students; more than anything else, it teaches them how to learn.

The significance of research-based education has been well corroborated by educationists around the world. In this regard, *Brainwork* proves to be a functional tool through which the educator not only expands the horizon of his/ her learners but also of his/ her own.

A. Aims of the Tool

- To empower educators to help students become “successful thinkers”
- To enable teachers to expand their horizons and instill a positive affinity for critical analysis in students
- To assist teachers in undertaking a multidisciplinary and research-based approach to teaching
- To enable teachers to inculcate critical thinking, creativity, deductive reasoning, and problem-solving skills in students

B. Expected Outcomes

The learner will be able to

- carry an in-depth analysis of the given information and come up with practical, creative and comprehensive solutions for the assigned tasks;
- enhance his/her critical thinking, creativity, deductive reasoning, and problem-solving skills.

C. Role of Teachers

The effective implementation of *Brainwork* requires teachers to create and assign a fairly challenging research-based task to students, which is mapped to the curriculum of their respective subjects. For a functional *Brainwork* task, a teacher must ensure that it is multidisciplinary, relevant, age-appropriate, and has a fair deadline for submission (usually One-month).

D. Role of Students

The successful submission of a *Brainwork* assignment requires students to interpret the given information (task) carefully, carry out relevant research, and conceive plausible explanations or answers for the questions asked. A properly completed task should entail the meeting of all conditions as specified by the educator in the *Brainwork* assignment.

E. Steps to Use the Tool

The educator should follow the below-mentioned steps to ensure proper usage of the pedagogical tool:

- 1) Prepare a “Brainwork Assignment Preparation Checklist” before task creation: The checklist should be referred to by the educator during (and at the end of) the preparation of the brainwork task. A good brainwork task should ideally have all the boxes ticked by the task creator.

Table 1 – Sample of the Brainwork Assignment Preparation Checklist

Sr. No.	Items	Yes/ No
1	Topic Mapped to the Annual Blueprint (document containing the details about the syllabus to be covered in each month of the given academic year) of the Subject Taught	
2	Element of Research (The task should ensure that students will undertake research)	
3	Multidisciplinary Approach (integration of information from multiple fields like Science + Mathematics)	
4	Material Required (preferably, best out of the waste)	
5	Conditions to be Fulfilled (mention the requirements that learners need to meet to produce a successful brainwork)	
6	SMART Goals related to the Task	
7	Date of Submission and Other Important Details	
8	Rubrics of the Assessment (criteria for evaluating brainwork)	
9	Sample Answer	
10	Orientation Session on Brainwork (a preliminary training session)	

- 2) Select the chapter for *Brainwork* assignment: The chapter should be mapped to the annual blueprint (the layout showcasing the syllabus across different months of the academic year) of the subject chosen. For instance, if the topic of “Diary Entry” is to be taught to the students of Grade 7 in the months of October and November then, for the mentioned months (October-No-

vember), the English teacher will prepare the Brainwork assignment to be assigned to students on the topic of “Diary Entry”.

- 3) Frame the *Brainwork* assignment: During the process of framing, the educator should keep the element of research at the centre and follow a multidisciplinary approach by adding elements relating to disciplines other than his/ her own. The fusion of familiar and unfamiliar contexts would generally help teachers motivate their students in undertaking in-depth investigation of the topic. The various levels of complexity could then be added through the “Conditions to be fulfilled” section. For instance, the English teacher in the previous example may ask his/ her students to create the diary entries, thinking themselves to be a prominent historical figure (for research and multidisciplinary element) and he/ she may further list out subject-specific conditions to be fulfilled (such as, the students must use at least 4 kinds of adjectives in their diary entries).

More than anything else, the educator should be certain of what he/she expects from his/her *Brainwork* and therefore establish SMART goals for the students. Correspondingly, a fair deadline (date of submission - usually One-month), rubrics and other important details should be mentioned at the end of the *Brainwork* document. The educator must additionally depict the achievability of the task completion by rendering a Sample Answer – one which ticks off all the conditions of the assignment.

- 4) Conduct an orientation session on the *Brainwork* assignment: The last step for the effective implementation of the tool should include an explanatory orientation session on the created *Brainwork* task that the educator expects his/ her students to complete. A proper orientation to the task shall allow students to perform the activity assigned in the most effective and productive manner.

F. Assessment

The assessment of a brainwork task depends on a predetermined set of rubrics, which incorporates the core aims of the brainwork. The rubrics entail the allocation of marks from 1 to 5, depending on the learner’s performance, and are to be used for evaluation after the student has submitted his/ her brainwork assignment (at the end of the one-month deadline).

More or less, a general set of rubrics for brainwork would include levels of research, critical, analytical and creative thinking, and task-related proficiency achieved by students in increasing order.

Table 2 – Sample of the Brainwork Assessment Rubrics

Rubrics	Level	Marks Assigned
The learner understands the brainwork, carries out the basic task with considerable research along with analytical, critical, and creative thinking and meets all the conditions of the task.	Advanced	5
The learner understands the brainwork, carries out the basic task with considerable research along with analytical, critical, and creative thinking and meets most of the conditions of the task.	Upper Intermediate	4
The learner understands the brainwork, carries out the basic task with some research employing 2 of the 3 thinking skills (analytical, critical, and creative), and meets most of the conditions of the task.	Lower Intermediate	3
The learner understands the brainwork, carries out the basic task with some research employing 1 of the 3 thinking skills (analytical, critical, and creative), but does not meet most of the conditions of the task.	Beginner II	2
The learner understands the brainwork, carries out the basic task without research and does not meet most of the conditions of the task.	Beginner I	1

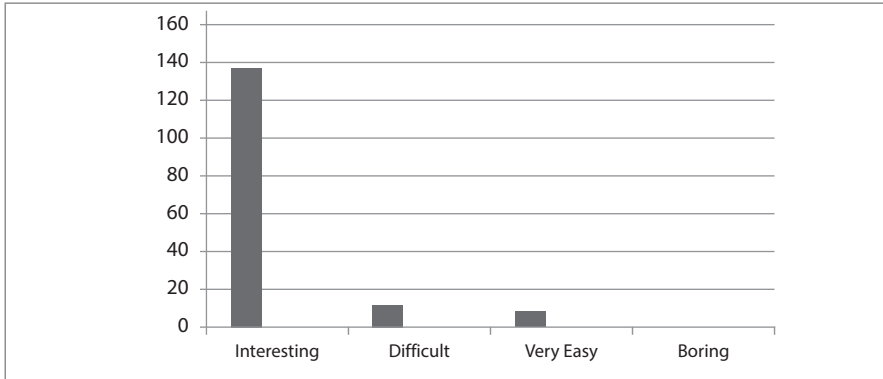
G. Students' Feedback

In the wake of Industry 4.0, which remains the impetus behind Education 4.0., the students' feedback is set to constitute the most beneficial tool for gauging teaching efficacy (Chitkara, 2021). Acknowledging the paramount significance of learners' feedback is therefore crucial for the educator, since students' feedback becomes the premise on which educationists promote the effectiveness of various pedagogical activities.

For the purpose of establishing the functionality of the *Brainwork* pedagogical tool, a sample of 160 students from Class 9 at Chitkara International School, Chandigarh, India was chosen and the following findings were made as per the students' feedback on the questions "How did you find the brainwork on Back to the (New) Future!?" and "How did the brainwork on Back to the (New) Future! help you increase your knowledge?"

Students' Feedback - Brainwork

How did you find the Brainwork on "Tour de Fun!"?

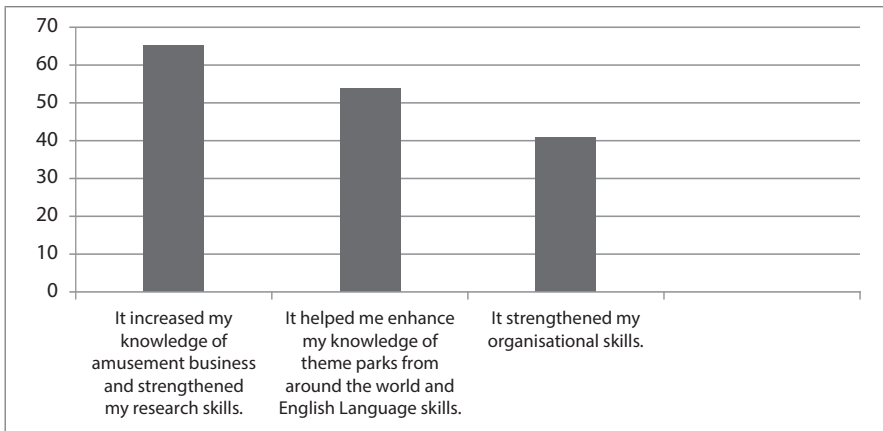


Source: Chitkara International School, Chandigarh, India

Graph 1 (Interpretation): Approximately 86% of students found the assigned Brainwork task to be “interesting”, whereas about 8% and 6% found it to be “difficult” and “very easy”, respectively.

Students' Feedback - Brainwork

How did the Brainwork "Tour de Fun!" help you increase your knowledge?



Source: Chitkara International School, Chandigarh, India

Graph 2 (Interpretation): As per the given data, a marked majority of students were able to elevate their knowledge of amusement business and research skills through the Brainwork (40.6%), whereas 33.8% and 25.6% were able to

elevate their knowledge of theme parks and English language skills and strengthen their organisational skills, respectively.

H. Visualized Examples

The students of class 6 at Chitkara International School, Chandigarh, India were assigned a Brainwork by their General Knowledge instructors, which was titled “*Tour de Fun!*”

The following illustrations relate to the said assignment, which showcase the activity assigned, the conditions to be fulfilled and the sample answer respectively.

BRAINWORK
GENERAL KNOWLEDGE

Topic - Tour de Fun

Introduction - How exciting it is to plan for fun outings and holidays; especially, when one's supposed to visit a fascinating theme park! In this brainwork, the students will get to experience just the same excitement as they design fact-based colourful brochures on any one of their favourite theme parks from around the world.

Task - Think of your favourite theme park and get researching. Prepare a creative brochure by including all the important details mentioned below:

- a) About the Place
- b) Tagline/ Slogan of the Theme Park (in your own words)
- c) Suppliers of Tickets/Access to Facilities/ Ticket Rates
- d) Park Timings/ Duration
- e) Attractions
- f) Food/ Cuisine
- g) Social Media Handles

Conditions to be fulfilled

- a) All information should be factual.
- b) Students must create their own taglines and slogans for the park chosen.
- c) Students must use at least 3 kinds of adjectives while creating their brochures.
- d) Students must use at least 3 kinds of sentences in their brochures.

Other Important Instructions

- a) Students must submit the hard copy (written) or soft copy (typed) of their Brainwork to their respective General Knowledge teachers through SchoolPad (if soft copy) or in school (if handwritten/ hard copy).
- b) The last date for the submission of Brainwork is 20th December 2021.

Source: Chitkara International School, Chandigarh, India

Picture 1 - Brainwork Task on “*Tour de Fun*”



Source: Chitkara International School, Chandigarh, India
 Picture 2 - Sample Answer for Brainwork on "Tour de Fun"



Source: Chitkara International School, Chandigarh, India
 Picture 3 - Sample Answer for Brainwork on "Tour de Fun"

CONCLUSION

Not subject to the surrounding worlds and times, educators need implementable learning aids for their students that assist them to augment their various thinking abilities viz. analytical, critical, and creative. Such learning tools teach them not just about new things but the art of learning itself.

When students learn ‘how to learn’, they invariably become solution-oriented. The adoption of “brainwork” as a learning tool, hence, becomes a way for the educator to instill the zeal for learning and investigation in students.

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