

## **Incorporating Tangible Instructional Materials in Teaching and Learning: Implications for Educational Assessment and Evaluation**

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**ABSTRACT:** *Tangible instructional teaching and learning materials are key to the easy attainment of any pre-determined instructional objectives. This assertion should be true for all classes of learners, especially those who are slow in learning and cannot respond adequately to verbal instruction. Learning with concrete and manipulative objects, as noted in this paper, not only enhances learning progress but also improves the competences of those with learning difficulties.*

**KEYWORDS:** Tangible instructional materials, teaching and learning, educational assessment and evaluation.

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### **INTRODUCTION**

Instructional materials are resources that facilitate classroom teaching and learning. Broadly defined, they refer to human and non-human means of effectively achieving pre-planned learning or instructional objectives. Human resources are those proceeding from within the instructor (teacher), example, the teaching approaches applied and the range of instructional qualities the teacher exhibits before learners. Flynn (2020) describes non-human resources as things or objects that exist externally of people, and can be seen, experienced and used by them. According to him, they are also known as material resources. Examples include, libraries, books, computers, clocks, plants and money. Learning with concrete or real materials can be a lot of fun, especially to young learners, whose age categories range from the primary to the crèche. Schneider (2022) refers to such concrete learning materials as tangibles or physical objects that can be grasped and manipulated in various ways. Tangible learning, according to him, refers to learning with physical objects (sometimes called manipulatives).

### **Definition/Meaning of Tangible Instructional Materials**

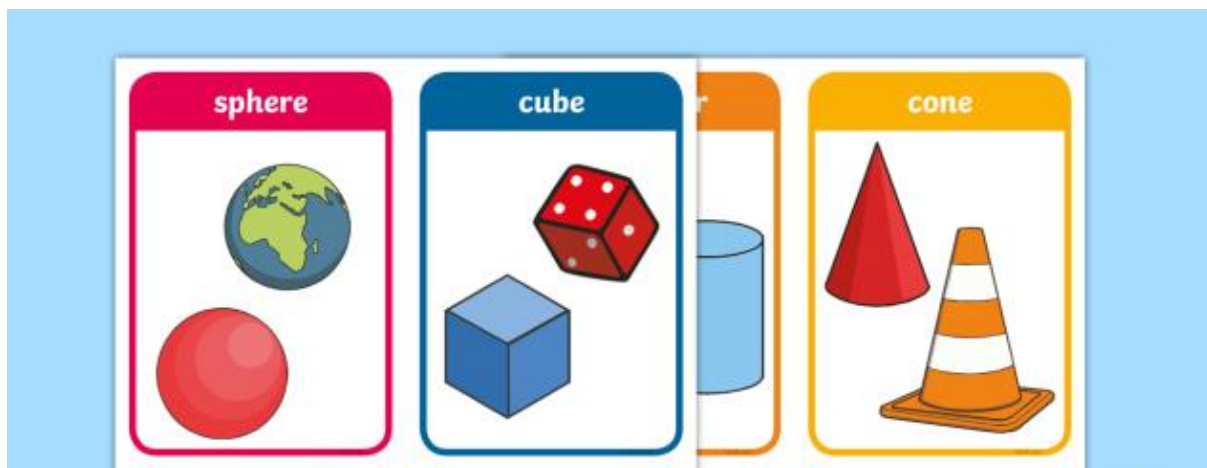
Tangible instructional materials are learning resources that can be seen, touched or manipulated during teaching and learning processes. They convey concrete or specific learning experiences, such as, through watching videos, looking at beautiful pictures, observing and manipulating real physical objects and so on. Concrete learning resources, which are also known as manipulatives, are physical objects that children can pick up and manipulate to improve their learning. According to Johnson (2021), the abstract nature of maths, for instance, can be

confusing for children, but through the use of these concrete, practical resources, they are able to 'see' the maths and make sense of what is actually happening. Once children are confident with a concept using concrete resources, they progress to drawing pictorial representations or quick sketches of the objects. By doing this, they are no longer manipulating the physical resources, but are still benefiting from the visual support the resources provide. He maintained that, once children have a secure understanding of the concept through the use of concrete resources and visual images, they are then able to move on to the abstract.

### Types of Tangible Instructional Materials

Tangible instructional resources include the following: Flashcards, manipulatives, visual aids, story books, games, videos, and apps or computers.

**Flashcards:** These are well designed numbers, letters of the alphabet, words, and various kinds of objects on cards that help young learners to really concretize learning. They can be designed pictorially and in words as illustrated:

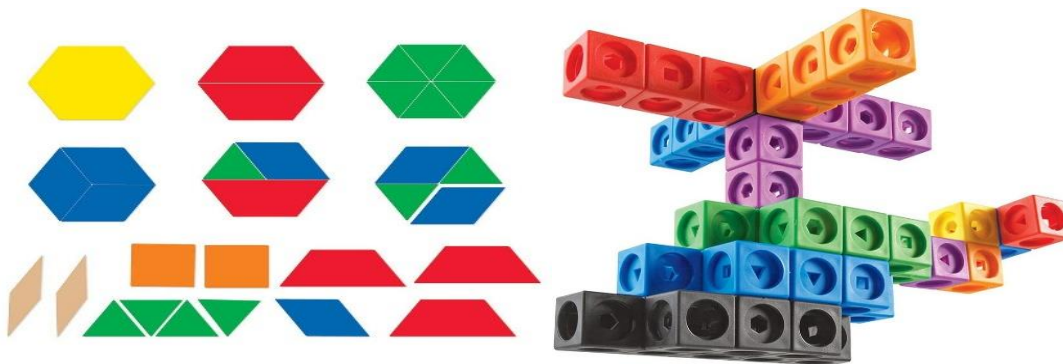


Flashcards for shapes



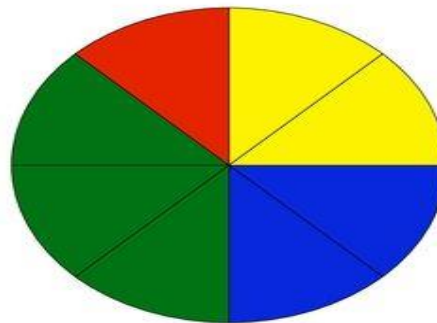
Flashcards for pictures

**Manipulatives:** These are physical objects that can be seen, touched, moved and manipulated by the learner or instructor and they convey real and concrete learning experiences. Manipulatives for learning of Mathematics include: interlocking cubes, pattern blocks, fraction bars and probability spinners. Some examples are clearly illustrated.

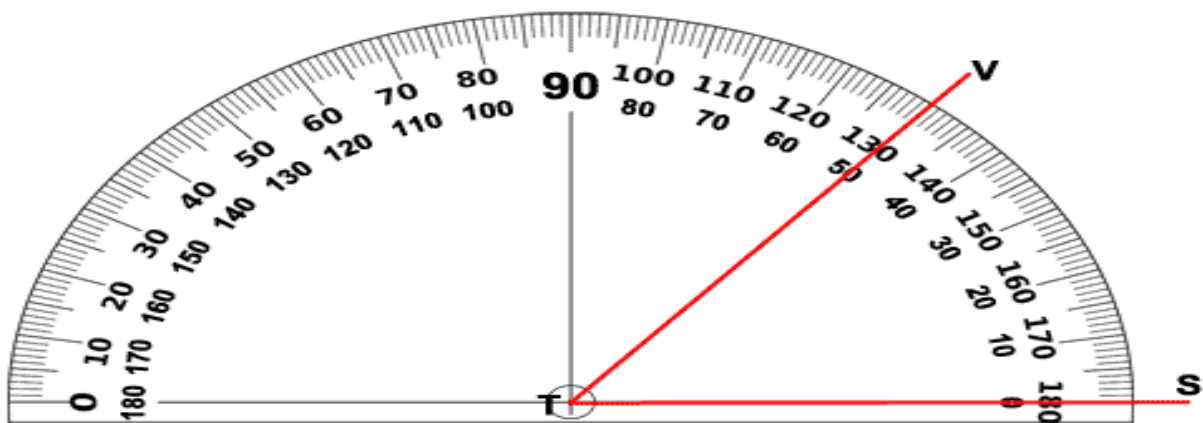


Pattern blocks

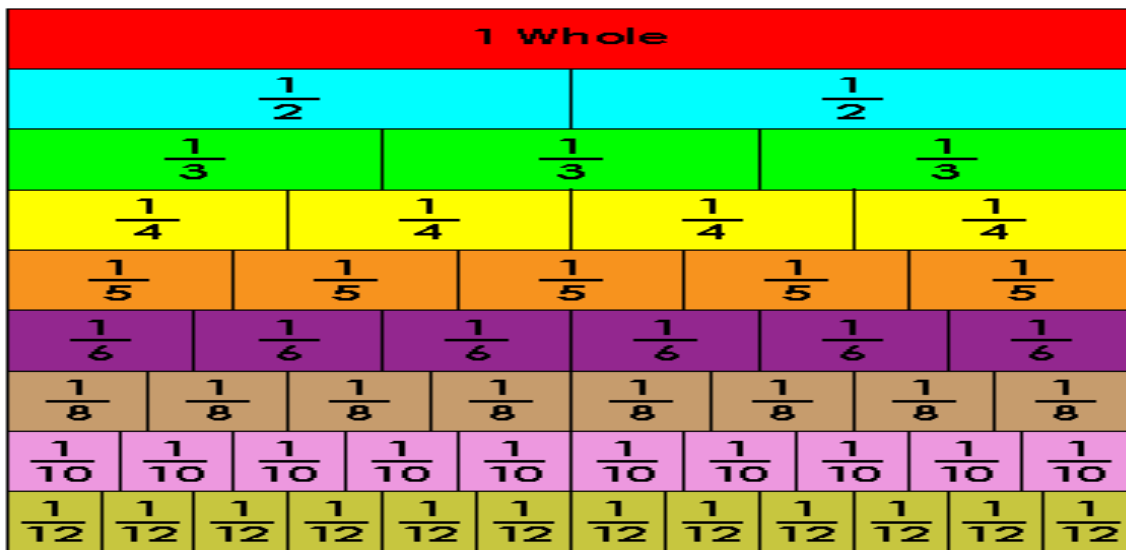
Interlocking cubes



Probability spinners



Protractor



Fraction bars

**Visual aids:** Physical learning resources that supplement the teacher's communication in speech and writing are referred to as visual aids. Green, Fairchild, Knudsen and Lease-Gubrud (2018) highlighted four reasons why they are used.

**To Clarify:** A picture really is worth a thousand words. In many cases, a visual aid can communicate a message more clearly than words. Imagine trying to explain the beauty of a Caribbean island or the complexity of an automobile engine without the use of a visual element. Words alone will not have the same impact as when combined with an image.

**To Enhance Memory Value:** When the audience receives the message in multiple ways, through the speaker's spoken message and through the visual aids, the memory value of the message increases. For some audience members, hearing the message will suffice, but for others, a visual element is more memorable. Using a visual aid allows the audience to tap into the message in a way that works best for them.

**To Fulfill Audience Expectations:** With the advent of slideware, such as PowerPoint, audiences have become accustomed to seeing these types of visuals accompanying a presentation. At times the speaker needs to use a visual aid because the audience expects it. For example, at conferences it is common that audience members need a printout of slides to validate attendance, so to not use a visual aid becomes a barrier to audience engagement.

**To Add Variety:** Although this should not be used as a primary purpose, if the speaker is using an aid to clarify or to enhance memory value, the aids also provide some nice variety for the audience. Avoid using aids just for variety, as they can too easily become more important than the message.

Some commonly used visual aids include the following: Flip charts, white boards, video clips, power point projectors, charts and graphs.

Story books: Young learners, especially, are often captivated by stories. Learning can be greatly enhanced when story books with rich and interesting lessons are read and explained in class before young learners.

Games: Classroom games have very far reaching positive effect on learning. Though they may involve lots of fun, but learning experiences are often derived from them, especially due to the huge attention they draw from learners.

Videos: Videos have served the purpose of learning enhancement over the years. Recently, with the evolution of technology and digital learning, videos have become common place, especially among teenage learners. Teachers and learners alike would find videos as very veritable tools that support effective classroom learning. Caution is, however, needed in the use of videos by young learners as the internet space is replete with illicit materials that promote moral decadence.

### **The Teacher's Role in the Effective Application of Tangible Learning Resources**

The teacher is at the centre of classroom learning. The tone of active learning must be set by him. If the learner is well motivated and supported by the teacher to properly adapt to learning activities, then a lot would have been done to ease and accomplish the instructional task. Although, there are learning resources that are exclusively manipulated by the learner for learning to take place, as earlier noted in this paper, the teacher must be on hand to guide the whole process. Some of such resources not provided by the college or school authorities or even the learners themselves should possibly be improvised by the teacher. In order to ensure effective and efficient use of tangible instructional materials by the key players in the teaching-learning processes, the following should be noted by the teacher:

- (i) Lesson plans must deliberately include specific concrete learning resources that the teacher intends to use during lesson delivery.
- (ii) Learners or pupils must be allowed ample opportunity to actively participate in learning using the concrete or tangible materials.
- (iii) Tangible or context-specific instructional materials that are within the teacher's ability to improvise should be readily provided.
- (iv) The teacher should patiently guide pupils to discover for themselves the learning experiences arising from the use of the concrete materials they are exposed to.

### **Importance of Tangible Instructional Materials in Teaching and Learning**

Instructional materials that are concrete or tangible support learning in very remarkable ways. The importance of these resources include the following:

- (i) They simplify abstract ideas into real or clear concepts.
- (ii) Tangible learning resources like manipulatives promote discovery learning.
- (iii) Instruction is made a lot easier for the teacher with the deployment of tangible instructional resources in the teaching process.
- (iv) The learners' attention to classroom instruction is often highly sustained.
- (v) Concrete learning resources help slow learners to cope with learning tasks.

(vi) Tangible instructional materials make learning very lively and less stressful for both teachers and learners.

(vii) Instructional objectives are more easily and rapidly achieved when lessons are delivered with concrete objects.

### **Implications for Educational Assessment and Evaluation**

Some learners, according to Tatematsu (2019), find it difficult to respond to verbal instruction in an adequate manner, a situation, which may yield misleading results when they are assessed to obtain their intellectual or cognitive competence using intelligence or standardized tests. He refers to this group of learners as individuals in the learning process of concept formation. Arguably, therefore, for the classroom instructor to achieve desired learning objectives, such learners should be exposed to tangible learning materials or manipulatives. This approach will not only yield valid post instruction assessment outcomes of learners but help to effectively enhance their learning progress. Classroom evaluation is the process of comparing a learner's observed and expected learning outcomes in any assessment situation. The process could be formative - where learners are continuously subjected to assessment activities or tasks within a given instructional season, or summative – involving a one-shot test at the end of a term or school session. Studies, including those of Albasli and Yesilce (2018), have shown that tangible learning materials improve classroom learning, and enhances the attainment of instructional objectives in very remarkable and significant ways.

### **CONCLUSION**

Instructional materials that are tangible and concrete make teaching and learning quite a pleasurable experience. Rather than think about or conceptualize abstract ideas, the learner is exposed to real physical objects and he can make meaning of them with ease. The teacher, on his part, exposes the learner to the objects during instruction and in some cases observes him manipulate others for learning to occur through discovery.

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