IMPACT OF AUGMENTED REALITY IN EDUCATION SECTOR: A CASE STUDY

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Abstract: Individuals can be taught and prepared from various perspectives regarding explicit data they required. A few strategies are classroom lecture, PCs and other electronic gadgets. The choice of education is dependent on learner's access to the technologies. Augmented reality technologies had received a great attention in educational sector. Augmented reality allows students to interact with the visual objects that appear in the same space in real-time and are related to the real world. Like never before, the education frameworks everywhere on the world, unequivocally influenced by the stun of the COVID-19 disaster, need to depend on advancement and computerized assets. Augmented Reality (AR) technology can empower teachers and students to get to specific materials past existence. The Aim of this meta-analysis is to determine different types of learning approach that have been executed using the augmented reality technology. Consequences of this meta-analysis disclose that group learning, interactive learning, experimental learning and game-based learning, are the top approach in the education that are used Augmented Reality. Such discovering will supply instructors with the direction on the learning approach that utilization Augmented reality and its prospects in education sector, which will later prompt further examination on how learning approach utilizing the augmented reality can be carried out in learning and educating effectively.

Keywords-Augmented Reality, virtual object, education sector, learning approach.

I. INTRODUCTION

The Augmented Reality technology has gone over a wide development in along with a few sorts of equipment, particularly with the advancement of various kinds of devices and keen gadget applications. Through a virtual advanced layer to improve the spatial perception expertise the Augmented Reality technology can fabricate dream in reality. This component can be used and has the likelihood to be utilized in the education sector. Augmented Reality can be unmistakable as the technology that used to blend virtual objects into this present reality, which will then, at that point come to fruition together in a similar world space. The COVID-19 pandemic has made the biggest aggravation of education frameworks ever, by constraining schools and colleges to close their entryways and affecting a phenomenal number of students around the world. Since March 2020, when WHO announced COVID-19 pandemic, 1.6 billion of students have been influenced in additional to 190 countries and all landmasses. Cessations of the educational spaces

have affected 94% of the world's student population, up to 99 % in low and inferior-centre pay countries (United Nation, 2020).Augmented Reality is at present turning into a vogue in the education sector. Investigates showed noteworthy outcomes where the understudies that utilized the Augmented Reality technology could improve their degree of inspiration just as having undeniable degrees of certainty and fulfilment in utilizing Augmented Reality - based cell phones in learning. These discoveries are viable with the investigation by that expressed educating by utilizing the Augmented Reality application could draw in the consideration of understudies and upgrade their learning inspiration.

II.   AUGMENTED REALITY: DEFINITION

Some Researchers in the computer sciences and the educational sectors are characterized AR differently. Kishino, Utsumi, Takemura, and Milgram (1994) characterized "Augmented Reality" by two methodologies: an expansive methodology and a confined methodology. In the expansive sense, AR alludes to "expanding normal input to the administrator with mimicked signals" (p. 283). Then again, the confined methodology stresses the technology angle and is characterizing AR as "a type of virtual reality where the member's head-mounted presentation is straightforward, permitting a reasonable perspective on this present reality" (p. 283). There were additionally researchers characterizing AR dependent on its highlights or attributes.

As proposed by Azuma (1997), AR can be described as a system that fulfils three fundamental features: a blend of certified and virtual universes, constant participation, and definite 3D selection of virtual object and veritable objects. Klopfer (2008) demonstrated that the term AR ought not be characterized restrictedly. This term might be useful to any of the technology that mixes real data and the virtual data in a significant manner. As per Klopfer and Squire (2008), AR could be extensively characterized as "a circumstance where a true setting is progressively overlaid with intelligible area or setting touchy virtual data" (p. 205). In the present circumstance, AR could give clients technology-intervened vivid encounters in which genuine and virtual universes are mixed (Klopfer and Sheldon, 2010) and clients' connections and commitment are augmented (Dunleavy, Dede, and Mitchell, 2009).

For teachers and fashioners, characterizing AR from a wide perspective would be more useful in light of the fact that such a definition proposes that AR could be made and carried out by fluctuated advancements, like personal computers, handheld gadgets, head-mounted shows, etc (Broll, et al., 2008; Johnson, et al., 2010b; T.- Y. Liu, 2009). That is, the idea of AR isn't restricted to a technology and could be rethought from an expansive view these days. AR misuses the affordances of this present reality by giving extra and logical data that expands students' experience of reality (Squire and Klopfer, 2007). AR may be founded on and go with technology, however it ought to be conceptualized past technology as it were.

III.   ADVANTAGES OF AUGMENTED REALITY

- **Open learning resources**- every time, anywhere. Augmented reality may be possibly succeeding paper readings, actual models, banners, printed manuals. It suggest versatile and more reasonable learning materials. Therefore, schooling turns out to be more available and portable.

- **No extraordinary gear is required**- In contrast to VR, augmented reality doesn't need any costly equipment. Since 73% of all the teenagers presently own a smartphone, AR developments are quickly accessible for the use of most of the future curiosity group.

- **Higher understudy commitment and interest**- Intelligent, gaming AR learning can emphatically affect understudies. It makes them drew in all the way through the workouts and makes their learning happy with fun and easy.

- **Improved cooperation abilities**- Augmented reality applications offer immense freedoms to differentiate and stir up exhausting classes. Intuitive exercises, where all understudies are engaged with the learning cycle simultaneously, help improve cooperation abilities.

- **A quicker and more powerful learning measure**- AR in instruction assists understudies with accomplishing better outcomes through representation and full submersion in the topic. Words generally not able to picture the justice, correct? In this way, other than examining hypothesis regarding something, students can view it through their own eyes, in the real life.

- **Reasonable learning**- Apart from training, talented organizing may be likewise profitable considerably from the use of AR. For example, strict proliferation of in-area circumstances may help excellently and the reasonable abilities needed for a specific work.

- **Protected and productive occupied environment organizing**- Visualize having the option to practice in the heart medical technique or practicing on a space vehicle without making others people in any danger way or gaming some huge number of dollars in damage if roughly cracks out severely. It is possible with AR.

- **All around suitable to any even out of schooling and organizing**- let it be learning games for playschool or influences on organizing, AR doesn't restricted to just one use case or the area of application.

IV. AR DRAWBACKS

Notwithstanding the documented benefits, there were some sure messes you may study when constructing EdTech activities with the augmented reality:

- **Lack of essential preparing**- A little instructors sometimes clash incorporating the fresh innovations as their practice creating don't give some of the fundamental skills. Objective to the best liberal educators and creative educational foundations are organized to put on the augmented reality applications in training.

- **Dependence on the tools**- Utilizing augmented reality in the classroom requires some detailed strength base. For example, all students doesn't have a cell phones prepared for supporting the AR applications.

- **Content convenience topics**- Some of the AR application that you assemble requirements to function admirably on every phases and devices. But that is as it might, it is mostly hard to give some parallel nature of AR contents on any of the gadget.

V.   AR LEARNING APPROACH

- **Constructivist learning** – by utilizing Augmented Reality in a manner that urges students to draw in on a more profound level with the undertakings, ideas and assets being concentrated using data overlays, students can make profound and enduring associations inside their insight base (Kerawalla, Luckin, Seljeflot, and Woolard, 2006).

- **Arranged learning** – bona fide and contextualized learning were empowered by the implanting of the educational encounters inside this real world entity and by carrying this present reality into classroom (Rasimah et al., 2011;Chen and Tsai, 2012; Dede, 2009; Dunleavy et al., 2009;).

- **Games-based learning** – Augmented reality systems can be used to facilitate immersive games-based learning by creating a digital narrative, placing students in a role, providing authentic resources and embedding contextually relevant information (for instance, Dunleavy et al., 2009; Klopfer & Squire, 2008; Squire & Jan, 2007). Using Augmented Reality systems to turn the real world into the environment in which games are played can often make skills transfer to real-life applications simpler and easier (Brom, Šisler, & Slavík, 2010).

- **Enquiry-based learning** – by offering a way to electronically assemble information for future analysis (for example Dunleavy et al., 2009) and give virtual models arranged inside a certifiable setting that are handily controlled (for example Kaufmann and Schmalstieg, 2003), Augmented Reality upholds enquiry by giving data that is logically pertinent to the subject being explored (Johnson et al., 2010).

VI.   STUDY METHOD

In this paper, subjective examination has been done through a deliberate writing audit to distinguish the information that exists on AR technology utilized in education. An efficient writing audit must "extensively distinguish, assess and combine all pertinent investigations on a given point" (Petticrew and Roberts, 2006). Besides, it tends to be characterized as "a blend of distributed materials that give assessment of recent or current literature, which may incorporate examination finding". It could possibly incorporate far reaching looking and a quality evaluation. The amalgamation is regularly story, and the examinations might be sequential, reasonable, and topical (Grant and Booth, 2009)

In this case study the Arksey and O'Malley's (2005) five-stage structure is used. The five phases of this system are:

1. Distinguishing research questions,
2. Recognizing applicable examinations,
3. Study selection,
4. Charting the information,
5. Summing up and reporting the outcomes.

6.1.   Distinguishing research questions

The point of this survey was to investigate the literature with respect to the utilization of AR application in educational situations. To catch the important research examines, following are some research questions that were presented to direct the research: Which are fields of education that are covered with the research articles? What are the primary classifications of the research articles

thinking about the pre-owned catchphrase? What different technologies are being utilized identified with AR? What are the future headings of the research of AR applications in the educational sector?

6.2. Recognizing applicable examinations

To cover a wide scope of studies with respect to the utilization of AR in education, the hunt was performed utilizing the accompanying watchwords: "Augmented reality", "AR". The source of the literature was Google Scholar, which gives a basic method to extensively look for insightful literature. Important papers were viewed as just papers distributed over the most recent a long time (from 2018 to December 2020). This was considered proper because of the fast technology improvement and the more extensive utilization of AR applications in education.

6.3. Study selection

Thirty research examines were selected and remembered for this audit. These articles were selected by the accompanying inclusion/ exclusion standards.
The inclusion standards were:
  i.   Papers published over the most recent 3-5 years;
  ii.   Studies that are completed in proper education setting;
  iii. Studies where an AR application is coordinated with or applied in the teaching learning interaction and learning results are accounted for.

The exclusion standards were:
  i.   Papers clarifying some business application, accessible on market, yet not logically based;
  ii.   Sneak peeks of theory and papers, or survey papers;
  iii. Studies that were completed in casual or non-formal learning settings.

6.4. Charting the information

The initial step was to make an elucidating analysis. Point of this examination is to give a starter outcome on some papers zeroing in on AR in education. For the spellbinding examination of the certain papers, three viewpoints were characterized: papers by time, fields of education, and by point are the keyword of those articles were thought of.
As indicated by the dispersion of papers over years, as displayed in Figure 1, we can see that thought of the point has been expanding in 2021 because of the genuine setting of pandemic.
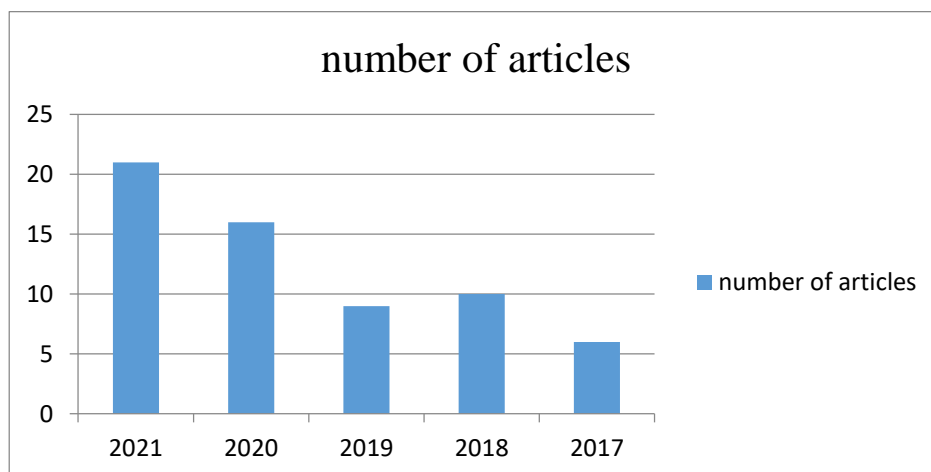

Figure 1. Distribution of paper over years

As to "Fields of education", investigations show that most articles investigated "numerous fields of education" and "science", while "clinical examinations", "youth education" are the least investigated. Figure 2 sums up the outcomes with respect to the utilization of AR by field of education.
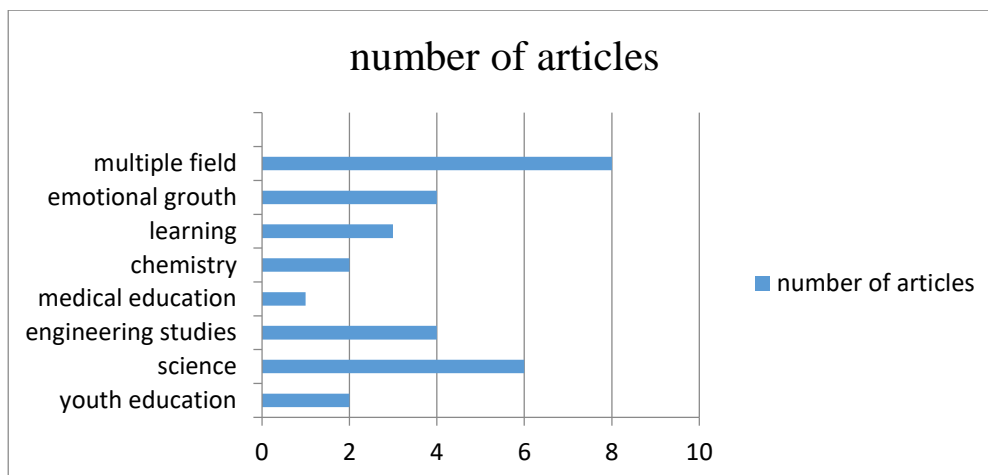

Figure 2. Distribution of papers by field of education

We can see that virtual reality is related with augmented reality technologies in papers. "Mobile learning" and "computerized educational assets" can be found in numerous articles. It is imperative to take note of that "instructor education" and "learning measure", "learning methodology" or "learning devices" are additionally vital in these examinations as it tends to be found in Figure 3.
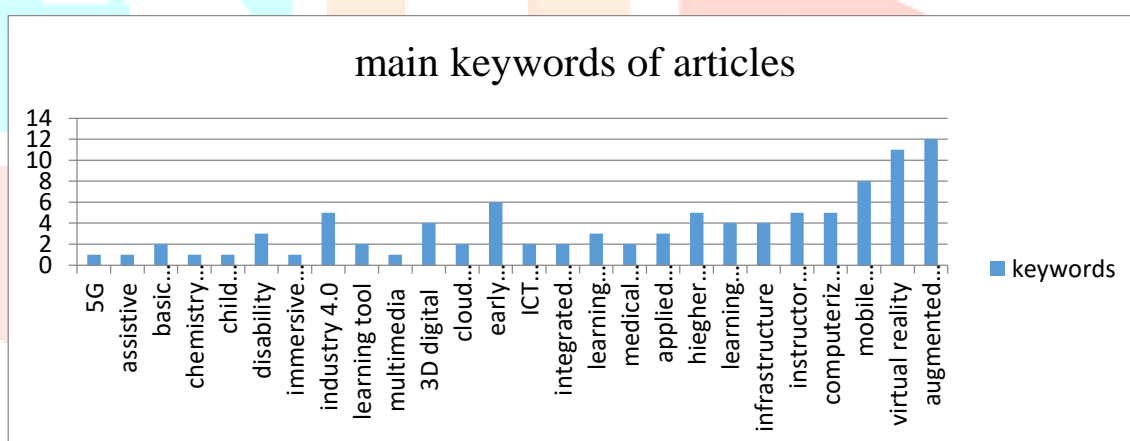

Figure 3. Distribution of papers by subject where the keywords of the articles

6.5. Summing up and reporting the outcomes

For this broad literature survey 30 investigations were broke down, by utilizing the substance analysis strategy for the reason and finishes of each article. All data has been gathered in six significant classifications dependent on the position involved by the pre-owned watchwords as introduced in Figure 3. The classes are virtual reality, mobile technologies, and computerized educational assets learning measure, instructor's education, and infrastructure.

Virtual reality

AR technologies have extraordinary potential in numerous fields for education application (Iatsyshyn and al., 2020). Frequently, AR and VR technologies are supplemented according to numerous specialists. The terminations of educational foundations influenced instructing and learning measures and affected students' inspiration and commitment. In this unique circumstance, AR/VR technology can help students and backing instructors. There are numerous articles which consolidate the records about the augmented reality and the virtual reality. The discoveries

represented a bunch of studies that give proof of expanded learning accomplishment, students' commitment, inspiration, and joint effort through the educational conditions that are advanced with AR/VR applications.

Huang by any means (2019) thinks about that AR and VR can both be utilized successfully to show science-based data. Notwithstanding, AR and VR have their own arrangement of qualities and shortcomings that ought to be thought of while incorporating these technologies into learning conditions. Eventually, the two technologies furnish students with an energizing new educational reality.

A real coordination of these technologies requires heaps of upgrades and changes not just with respect to designers and specialists of AR and VR, yet in addition instructors and all people identified with the field of education. Designers should propose VR and AR headsets and they are more agreeable and available. Indeed, a long utilization of the VR and AR receivers planned for the present causes some uneasiness. Concerning people identified with education, they should send more forward educational projects that fit well with the idea of these technologies and satisfy the requirements of the student (Elmqaddem, 2019).

VII. CONCLUSION

The current papers adds to growing the present status of exploration in the area of the utilization of Augmented Reality (AR) in education. The discoveries of this broad literature survey approve the reason that AR offers its own novel benefits for virtual learning in education. A lot of literature has been distributed in AR application in different spaces. Be that as it may, the condition of ebb and flow research in AR for the education space is as yet in its early stages. The exploration in this field should proceed and ought to be addressed to find the genuine capability of AR applications in education. In view of the aftereffects of this examination, future exploration needs to cover the accompanying subjects:

- AR technology application in training (Iatsyshyn and al., 2020)
- Peculiarities of executing the guideline of virtual reality in learning with the utilization of various frameworks of augmented reality (Nurbekova and Baigusheva, 2020)
- Integration of versatile cloud-oriented frameworks, the AR technologies, and the cutting edge academic methods (Marienko et al., 2020)
- Role of intellectual or perceptual burden while utilizing these AR technologies (Huang et al., 2019)
- Impact of past experience utilizing these technologies on the viability of AR and VR for education (Huang et al., 2019)
- AR use in establishing new learning conditions, execution of new stages (Gudonienė and Rutkauskienė, 2019)
- New sorts of substance that can be utilized and not utilized with AR (Hantono et al., 2018)
- Motivational plan of augmented reality technology for little youngsters (Masmuzidin and Aziz, 2018).

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