

A Survey on Autism Spectrum Disorder and E-Learning

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Abstract—Autism or mental imbalance is turmoil in the development and improvement of a mind or central nervous system that covers a huge range of skills, impairment and symptoms. The children who are experiencing autism (or mental imbalance) confront challenges in conveying and adjusting in the group as they experience difficulty in understanding what others feel and think. These days learning innovations changed instructive frameworks with amazing advancement of Information and Communication Technologies (ICT). Moreover, when these innovations are accessible, reasonable and available, they speak to more than a change for individuals with Autism Spectrum Disorder. In this paper, a writing study and foundation study is done on the Autism Spectrum Disorder (ASD) and E-Learning System for Autism Children.

Keywords—Autism Spectrum Disorder (ASD); E-Learning System; Data Mining; Classification techniques.

I. INTRODUCTION

The world provide a details regarding disability certifies that more than one billion individuals on the planet live with a few incapacities and there are around 150 million school-matured kids with inabilities. Large portions of these children are rejected from educational opportunities and don't finish essential training. At a similar line, late UNESCO Global report shows that individuals with incapacities confront an extensive variety of barriers, including access to data, education and an absence of openings for work. However Information and Communication Technologies (ICT) can be an effective instrument in supporting training and consideration for people with incapacities. Technological development can empower individuals with disability to enhance their personal satisfaction. The effective use of such innovations can make classrooms more comprehensive, physical situations more available, educating and learning substance and systems more tuned in to learners' needs.

Truth be told, the nonstop advance of ICT raised the need to advance toward enhancing the learning quality connected in education and preparing frameworks by tending to new points of view and openings. E-Learning rises as the responses to satisfy that need [1] and vouches to go to the adapting needs of the understudies in a customized and comprehensive way. Really, there is no lack of hopefulness about the capability of e-Learning to decrease hindrances to training and enhance the lives of people with disability [2].

Accordingly, creating available online educational situations shows up as an important answer for deliver this issue and to expel the hindrances that individuals with incapacities may meet when they get to these learning technologies. An appropriate innovation needs to give disability individuals with customized and adaptive learning experiences that are custom-made to their specific education needs and individual characteristics. It ought to likewise enhance their learning speed, learning effectiveness and satisfaction.

II. TYPE KEY DIMENSIONS OF E-LEARNING SYSTEM

A. The early Developments Technology

Just like the case with numerous past education technologies ("Open Learning", distance education, resource-based learning, and educational television) a great part of the concentration of early e-learning activities was on the technologies [3] this is the "e" part of e-taking in, the computerized programming and equipment technologies that support communication, network environments and current data. Regularly e-learning has abused more current electronic and advanced technologies (Enterprise level learning, Content Management system, Web and Internet), equipment and programming applications, albeit more traditional or independent media (CDs, DVDs, and conferencing technologies) are not blocked.

In the Australian setting an accentuation on the web and organized innovations prompted the reception of terms, for example, "online education", "internet teaching" and "web based learning" [4], terms which in some routes came to be utilized conversely, yet in themselves were non-particular or needed clearness of importance. Different terms, for example, "networked learning", which picked up acknowledgment in the late 1990s, additionally pushed the energy of the web and communication networks, albeit here the accentuation was more on making collaboration, systems administration and communication between tutors, resources and learners, than on the more varied scope of exercises advanced by e-learning heroes.

The vocabulary of e-learning is accordingly frequently dangerous and re-rises as an issue as for its integration and adoption within an organization. The authors give another case of the significance of dialect as for e-learning, in the utilization of term "instructional plan", as opposed to "Educational outline" or "learning outline" [5].

The present era of e-learning has been to a great extent in light of customary originations of educating and learning. The predominant customary instructional method, a content focused approach, depends on the conveyance of data to students. As needs be, "Broadcast" or "Transmission" modes and technologies were utilized (e.g. download innovations, for example, video-or sound on-request) – those which encouraged one way dispersal or the broadcast of data by means of the web or intranets, or, on the other hand remain solitary electronic technologies, for example, CD-ROM and videocassette.

B. The Later Developments Technology

The movement of web based technologies within institutional conditions had two prompt effects. To start with, a significant part of the extravagance of the best of the interactive sight and sound resources was downsized, because of the specialized restrictions of systems and servers said beforehand. Also, be that as it may, the limit of the web to achieve more students at more areas prompted an expansion of single stand-alone websites serving singular courses. Issues developed about the viability of these stand-alone websites from both the institutional and the learner viewpoint. For instance, from the institutional viewpoint, maintenance and improvement of individual websites are winding up noticeably profoundly resources escalated and, from the learner's point of view, various courses websites requested students got comfortable with an alternate UI and route for each of their online subjects.

These issues of scalability and a standard UI were improved to some degree through the development in the mid-to late 1990s of learning or course administration frameworks, for example, Blackboard, Top Class, and WebCT. Such enterprise wide systems, Course Management System (CMS) and Learning Management Systems (LMS) [6], tended to issues of scalability and standardization, yet they were still essentially introduced on traditional college originations of coursework and of student and teacher parts. Typically connected with formal or organized courses, they were at first composed around more traditional originations of coursework learning, with discrete organized spaces for subject aim and objectives, content, student communications or discussions, inquiries and so on. The dialect of the UI, get to and administration benefits were additionally introduced around traditional, for the most part US based originations of the parts and exercises of teachers and students, with the teacher in a place of control. This raised a few sensitivities and obstructions concerning appropriation of new technologies among some staff (and students) with the Australian Higher education segment, who felt that these devices were more outfitted to preparing and corporate needs.

Later frameworks developments to oversee education substance are intended to organize, capture, store and distribute digital content or resources, normally as discrete units or pieces of substance with related metadata for retrieval and search. A key method of reasoning for Content Management System, computerized repositories and resources generators has been to achieve more noteworthy proficiency through the re-usability of advanced learning resources, an

idea based on the instructional method of the resource based learning model.

C. Current Issues and Trends

The appearance of enterprise frameworks, (for example, content management, student management and learning management) [7] presented new difficulties of framework similarity, measures and frameworks reconciliation. A huge pattern in the previous couple of years, in this way, has been mix, driven by the longing for speed and readiness (Hayward, 2003) and the requirement for "consistent" operations. The coordination obviously or learning management and CMS to a Learning Content Management System (LCMS), with normal or comparable arrangements of usefulness and applications, has been joined by yet another overlay of ambiguities about the extension or limit of e-learning technologies. This coordinated e-learning condition, for instance, is broadening to incorporate library and student management systems.

Another huge pattern related with the development of e-learning is the constant progress of innovative many-sided quality. Developments include:

- Technologies which builds the level of synchronous, communication at a distance and two way interaction, over internal systems and the web (conferencing, research and real-time communication spaces, for example, video, voice-over-IP and get to matrices), one-to-many and one-to-one.

- Media rich innovations including video, sound, recreation and 3D immersive conditions situations which upgrade telepresence (the human communication measurement related with a feeling of "being there") or situations which degree the creative energy and ability to encounter new creative spaces.

- Technologies which upgrade access, portability and adaptable learning choices that is satellites, wireless and mobile innovations, interfacing with the web through TCP/IP (Transmission Control Protocol and Internet Protocol) and Bluetooth.

Some portion of the last pattern is the expansion of handheld devices, cell phones and different remote innovations, giving students promptness (however not really quality) of access to e-learning resources, data and exercises. Each of these developments is extending in usefulness and the quantity of client applications upheld, bringing about a merging of uses accessible through the one gadget. PDAs (Personal Digital Assistants), for instance, have moved past the essential dairy, calendar and postage information book capacities to join examining, information store, seeking, cross examination, sorting and recovery abilities, moving toward the usefulness of PCs of the mid-1990s.

The utilization of electronic communication and data technologies for instructing is a center component of the e-learning idea, yet unseemly accentuation on innovation

alone restricts the extent of e-learning exercises for academic staff, learners and society on the loose.

III. AUTISM SPECTRUM ORDER

The ASD issues are more typical in the pediatric populace than are some better referred to clutters, for example, Down syndrome or spinal bifida, diabetes. The prior the disorder is analyzed, the sooner the kid can benefit from outside assistance through treatment intercessions. Pediatricians, family doctors, childcare suppliers, parents and educators may at first expel indications of ASD, hopefully thinking the youngster is only somewhat moderate and will "get up to speed."

All kids with ASD exhibit shortfalls in 1) social collaboration, 2) verbal and nonverbal communication, and 3) repetitive practices or interests [8]. Likewise, they will regularly have surprising reactions to sensory experiences, for example, certain sounds or the way questions look. Each of these symptoms runs the extent from mellow to serious. They will introduce in every individual youngster in an unexpected way. For example, a kid may experience little difficulty figuring out how to read however show to a great degree poor social connection. Every kid will show communication, social, and behavioral examples that are individual however fit into the general finding of ASD.

Kids with ASD don't take after the normal examples of youngster development. In a few children, clues of future issues might be clear from birth. Much of the time, the issues in social skills and communication turn out to be more observable as the kid lingers facilitate behind other kids a similar age. Some other kids begin off all around ok. As a rule in the vicinity of 12 and 36 months old, the distinctions in the way they respond to individuals and other unusual practices end up plainly obvious. A few parents report the change as being sudden, and that their kids begin to reject individuals, lose language, social skills and act strangely they had beforehand obtained. In different cases, there is a "plateau," or leveling, of advance so that the contrast between the kid with a mental imbalance (autism) and other children a similar age turns out to be more recognizable. ASD is characterized by a specific set of practices that can go from the exceptionally mellow to the extreme. The accompanying conceivable markers of ASD were recognized on the Public Health Training Network Webcast, Autism among Us.

A. Possible Indicator of Autism Spectrum Disorders [9]

- Does not babble, point, or make meaningful gestures by 1 year of age
- Does not talk single word by 16 months
- Does not consolidate two words by 2 years
- Does not react to name
- Social abilities and Loses language
- Poor eye contact
- Doesn't appear to know how to play with toys
- Excessively lines up toys or different items
- Is appended to one specific toy or question
- Doesn't smile
- At times seems to be hearing impaired

B. Problems that may Accompany ASD [10]

a) Sensory issues:

When kids' recognitions are exact, they can gain from what they see, feel, or listen. Then again, if sensor data is defective, the kid's experiences of the world can be confusing. Numerous ASD children are exceedingly adjusted or even agonizingly touchy to specific sounds, surfaces, tastes, and smells. A few kids discover the vibe of garments touching their skin practically excruciating. A few sounds—a vacuum cleaner, a ringing phone, a sudden tempest, even the sound of waves lapping the shoreline—will make these kids cover their ears and shout [10].

In ASD, the brain appears to be not able adjust the senses suitably. Some ASD children are careless in regards to extreme pain or cold. An ASD kid may fall and break an arm, yet never cry. Another may bash his head against a wall and not jump, but rather a light touch may make the kid shout with alert.

b) Mental Retardation:

Many kids with ASD have some level of mental weakness. Whenever tried, a few regions of capacity might be ordinary, while others might be particularly week. For instance, a youngster with ASD may do well on the parts of the test that measure visual abilities yet procure low scores on the language subtests.

c) Seizures:

One in four children with ASD creates seizures, regularly beginning either in early adolescence or childhood. Seizures, caused by anomalous electrical action in the mind, can create a temporary loss of awareness (a "blackout"), a body shaking, irregular developments, or gazing spells. Now and again a contributing element is an absence of rest or a high fever. An EEG (electroencephalogram—recording of the electric streams created in the mind by methods for anodes connected to the scalp) can help affirm the seizure's nearness. By and large, seizures can be controlled by various medicine called "anticonvulsants." The dose of the pharmaceutical is balanced precisely so that the minimum conceivable measure of prescription will be utilized to be successful.

d) Fragile X Syndrome:

This issue is the most well-known acquired type of mental hindrance. It was so named in light of the fact that one a player in the X chromosome has an inadequate piece that seems pinched and fragile when under a magnifying lens. Fragile X syndrome influences around two to five percent of individuals with ASD. It is essential to have a kid with ASD checked for Fragile X, particularly if the parents are thinking about having another child. For an obscure reason, if a kid with ASD likewise has Fragile X, there is a one-in-two shot that young man destined to similar parents will have the disorder different individuals from the family who might be examining having a kid may likewise wish to be checked for the disorder.

IV. E-LEARNING AND ASD CHILDREN

In this innovative period, e-learning is the connection amongst education and web. It is a well-known educational strategy giving limited time way to up degree and reconstruction of training in all real nations of the world. Notwithstanding, to the extent the students with Autism Spectrum Disorder (ASD) [11] are concerned, they regularly do not have the chance to get prepared by means of e-learning technology. There is a reasonable sign that the majority of the e-learning specialist organizations see themselves as negligible suppliers of technology. Thusly, while each technologically conceivable element is incorporated into e-learning condition, there is a nonappearance of openness integration for ASD students. These merchants frequently negate themselves, from one perspective, they assert that they give e-Learning answers for all, however can't fuse the requirements for ASD students. It has turned out to be evident that the effect of not considering the accessibility issues while executing e-Learning solution will challenge the flexibility procedure.

ASD is a general term that portrays the neural development issue. This ASD can make a man experience difficulty learning and utilizing certain aptitudes. The abilities frequently influenced are: speaking, listening, reasoning, doing maths, writing, and reading expresses that ASD are caused by contrast in how a man's brain functions and how it forms data. Children with ASD are not "lazy" or "dumb". Indeed, they for the most part have normal or better than expected insight. Their brain simply handles data in an unexpected way. There is no "cure" for ASD. In any case, kids with ASD can be high achievers and can be instructed approaches to get around the ASD. With the correct help, kids ASD can and do learn effectively. The examination in the field of giving help with figuring out how to ASD is still in early stages [12].

V. RELATED WORKS

Autism is involved extreme wrapping impedances in a few vital zones of improvement in a man [13]. These hindrances could be any of the accompanying cases; behavioral, imaginative, social interactions and communication [14]. The dominant part of autism children experience learning troubles, despite the fact that some may have been furnished with a normal knowledge [15]. The incapacity of these children can likewise fall under the classifications of visual, epilepsy and sound-related issues. Autism is identified with the conduct of a man as an impact of obscure biological dysfunctions of the mind that has outcome on the response or development of the brain while taking care of data. This brokenness can extend from issues that lie between any of the processed data or even deciphered data, received information.

Autism kids for the most part experience the ill effects of behavior, poor social interaction, communication and substantial varieties in learning capacities. In the article entitled "Introduction to Autism", Zander (2004) [16] asserted that social collaboration is a primary issue experienced by mentally unbalanced children, whereby the kids experience issues in directing eye contact, non-verbal communication, outward appearance, and modulation. Numerous autism children can't demonstrate social or passionate criticism and don't impart their emotions to others [17]. It is likewise noticed that autism kids don't have comparative interests as other offspring of a similar age. Regardless of the possibility that they do, they can't communicate well and create and look after

fellowships. Autism children are actually deferred in language development. Subsequently, a large portion of these autism kids create poor talking abilities as it is a troublesome undertaking to advance social and relational abilities in kids with a autism [16]. Other than this, they likewise show unordinary, recognizing conduct which incorporates constrained intrigue and worried on a particular question, hard adherence, and adaptable recognition to non-utilitarian consistency. [16] likewise highlighted cases of such recognizing practices, for example, turning the wheel of a toy, arranging toys monotonously, yet rarely draw in themselves suddenly and getting distinctive diversions and pretends.

Other than this, [16] additionally reasoned that the level of seriousness in autism children fluctuates starting with one individual then onto the next as far as knowledge and learning capacity. This may be because of a few causes, for example, sadness, the nature of the autism issue, epilepsy, hereditary indications, and so on. Thus, the need to build up an effective and a successful technique to instruct these kids emerges. There are a few viable showing strategies recognized to be utilized while instructing these autism children.

A virtual reality based learning education that incorporates a virtual situation (VE) and virtual operators is a powerful strategy to support the social relational abilities of kids with a autism. In such conditions, where social aptitudes can be honed over and again, the outcome have a less debilitating, less social testing, more controllable and agreeable process when contrasted with an up close and personal communication situation [18]. Other than this, it likewise enables the client to genuinely observe on the screen as opposed to how the earth is really experienced, all things considered. For instance, the client would experience this by means of a standard PC and headsets. It is likewise noticed that the notoriety of virtual agent technology is because of its support to component based programming designing, adaptable operations, simple programming viability, versatility to this present reality and an extensibility of the product itself. Virtual operators have turned out to be progressively pervasive in Human Computer Interaction (HCI) [19]. Among the illustrations are exemplified conversational specialists and symbols. Exemplified specialists can be characterized as 'Interfaces in view of the human analogies, which look human-like and copy an eye to eye communication style.' Examples of different typified operators utilized as a part of HCI research are Pedagogical Agent (PA's), Embodied Conversational Agents (ECA's), Relational Agent (RA's), and visit bot operators [20]. The ECA's are engineered characters that can keep up a discussion with a client. Thus, numerous virtual-reality based learning apparatuses utilize virtual agents to convey information and abilities to autism children.

Virtual conditions additionally incorporate the portrayal of individuals or virtual operators and articles which have been utilized as a part of different fields for subjective treatment. For instance VE has been utilized as a part of conquering dizziness among autism kids and pteromerhanophobia of a few patients. VE has additionally been utilized as a part of helping impaired individuals create ordinary abilities. As indicated by [21], VE is one of the devices which can be utilized as a part of educating a social story for autism kids. Past research likewise highlights an individual contextual investigation directed to create a report in view of a perception and remarks

from two autism kids utilizing two distinctive virtual situations, for example, virtual bus environment and virtual cafe.

VI. CONCLUSION

There is an expanding acknowledgment that successful learning requires quality educational substance, as well as a proper setting that incorporates help and a comprehension of the e-learner. For this situation, autism children require a successful learning apparatus to build up their insight, as well as their practices. It is noticed that because of the autism disorder, these kids create irregular apprehensions which confine their capacity to do their day by day tasks. In future, a new e-learning framework will be developed for ASD kids.

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