

Understanding the Challenges of Learning Disabilities: The Information Processing Theory Perspective

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Abstract

Learning disabilities affect the totality of the individual and national productivity yet, it is most neglected in the common wealth of exceptionality. This continues to complicate the fate of the discipline, and the provision of professional intervention services. Despite the wealth in models and principles of the field, many issues still hinder seamless conceptualization of the disability, 60 years after its birth. This discourse aims at a proper understanding of disability, as a way of demystifying learning process and why those with learning disabilities find it unnecessarily difficult to learn like their peers. This paper uses cognitive psychology theory of information processing to situate learning disabilities in the context of learning activities as information in the classroom. The paper defines disability, its nature, challenges, and explains why those with the disability find it very difficult to learn and perform like their peers in some academic tasks. Information processing theory is used to discuss how stimulus from learning environment affects the way information is processed, as well as the relatedness of the theory to learning disabilities. The study concludes that any distortion in the processing stage will affect ability to learn, and suggest among others that technology should be used to mitigate and improve the processing of stimulus from learning environment to enhance the understanding of disability.

Keywords: *Learning disabilities, heterogeneity, information processing, dysfunction & lateralization*

Introduction

Learning disabilities as special needs conditions is as old as mankind because in African traditional society teaching and learning took place with emphasis on cultural heritage and gender-based role socialization. It was however not identified and known as a disability yet, there were persons who had difficulties learning, following directions, knowing names of things, counting, differentiating objects, sounds, making meaning from culture-based signs, interpreting and following sounds or rhythm of traditional drums used for different occasions. Disability has gone through many phases of development without a universally accepted nomenclature until 1963. Before the role of Samuel Alexander Kirk in shaping disability, it was known by different names such as minimal brain damaged, brain dysfunction, perceptual disorder among others. Within 60 years of existence, the disability had experienced many controversial issues in inclusive of lack globally accepted conceptual definition. However, it is conceptually, sees the disability as:

Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical skills. These disorders are intrinsic to the individual, presumed to be due to dysfunction of central nervous systems, and may occur across the life span.

Problems in self-regulatory behaviors, social perception, and social interaction may exist with learning disabilities but do not, by themselves, constitute a learning disability. Although learning disabilities may occur concomitantly with other disabilities (e.g., sensory impairment, mental retardation, serious emotional disturbance), or with extrinsic influences (such as cultural differences, insufficient or inappropriate instruction), they are not the result of those conditions or influences (NJCLD, 1990, p. 1).

This seemingly and universally accepted definition contain few issues and construct when it is critically examined especially from layman understanding. These issues pose puzzle to understanding the disability, they are, measuring of significant difficulties, presumed to be due to central nervous system (CNS) and terminologies such as heterogeneity, intrinsic, concomitant occurrence etc. In addition to these issues, the constructs that makes it unique include, heterogeneity, significant difficulties, intrinsic to the individual, concomitant occurrence with other disabilities, and exclusion of extrinsic influences. As part of efforts to uncluck the myth of understanding learning disabilities, different models have been adopted to ease the task, most recently is the element model (Orim, Orim & Unimuke, 2023).

Learning disabilities unlike other disabilities is learning or school-based disabilities which implicate the state of brain and the center nervous system. As expressively captured in NJCLD, it is presumed to be due to CNS. Base on this, it logical to trace the etymology to brain considering the fact that learning is basically a cognitive activity and any distortion in its system or parts affect the learning process. Evident on this proposition is the concept of Hemispherization or lateralization which localized different parts of the brain to various skills and activities. For instance, ability to read or perform any language activity is associated with left hemisphere of the brain. The implication of this concept is that if part of the brain responsible for any skill or activity is dysfunction the ability of the person to perform the task will be affected. Many studies have confirmed the effect of lateralization on learning process among children with learning disabilities.

Damage to either the right or left hemisphere, and its resulting deficits provide insight into the function of the damaged area. Left hemisphere damage has many effects on language production and perception. Damage or lesions to the right hemisphere can result in a lack of emotional prosody or intonation when speaking. Right hemisphere damage also has grave effects on understanding discourse. People with damage to the right hemisphere have a reduced ability to generate inferences, comprehend and produce main concepts, and a reduced ability to manage alternative meanings (Patel et al, 2018, p.13).

Most intriguing nature of learning disabilities is that its hidden, no facial value and lack sensory evidence except if there is case of co-existence. This among other factors make it look as if it not a disability yet it affects the ability to learn most critical school subjects and the use of core skills necessary for human survival as well as increased productivity. This circumstance has and continued to pose learning challenges to children with the disability, parents' attempt to understand why children have difficulties learning some skills and subjects, teachers' efforts to

ensure meaningful learning, the public willingness to fathom reality of the disability and government whose responsibility is to provide inclusive learning environment to foster holistic development of the individual. The Misery of learning disabilities steams from inability of parents, teachers and the public to understand the effect of exceptional conditions like learning disabilities can have on the individual learning outcome and chances of survival in a modern competitive society.

Difficulties children with learning disabilities have in learning and expressing even what they have mastered has been a subject of research and concern to many stakeholders in education. To address this, Orim, Orim, Unimuke (2023), Lerner and Kline, (2006), and Pierangel and Giulian (2006) explain these from three perspectives, the disability-based perspective, individual profile perspective and General perspective. As a disability that cut-across gender, race, age, socio-economic status and, religious affiliations and a high incidence and prevalence, it can be found in every family, school, classroom, society in Nigeria (Obani, 2006, Orim et al., 2017). From the forgoing, it is imperative that efforts be made to further simplify the nature of the disability using a theory related to the suggested primary source of the disability such as information processing theory. The theory attempt to explain how the brain and related system integrate and process stimulus as learning activities from any learning environment. Therefore, this paper is framed to conceptualized learning disabilities, discuss the challenges of learning disabilities as a field of study, advance reasons for the difficulties experienced by children with the disabilities, and discuss information processing model with emphasis on how it explains and relates to learning disabilities.

Understanding the Concept of Learning Disabilities

Sound knowledge of learning disabilities influence or determine the quality of services provided for clients/learners in diagnostic or classroom setting. It is therefore imperative for teachers and other relevant stakeholders to have conceptual knowledge (manifestation or presentation, characteristics, types, symptoms etc) of the disability. The history of disability reveals that within its 60s of existence more than 40 definitions have been advanced in the field yet there is no universally accepted definition(s) (Obani, 2006). In the quest to address this issue, different approaches, models have been recommended and used. According to Ntukidem and Orim (2015) these approaches and models include, definitive, descriptive approach and elements model, discrepancy model, etc. Theoretical perspective has also been used to understand the disability. Each of these approaches, models, and theories have its own merits and flaws, it is incumbent on the author to balance the discourse for the purpose of scholarship and understanding (Osuorji 2019).

Learning disabilities are neurobiological disorders that inhibits the proper functioning of the human system or parts of the body responsible for effective coordination of learning process to the extent that the deficit negatively and significantly affect one's ability to learn and use critical skills and subjects in school. Prominent among definitions of learning disabilities is Kirk definition, which sees learning disabilities as a retardation, disorder, delayed development in one or more of the processes of speech, language, reading, spelling, writing, or arithmetic resulting from a possible cerebral dysfunction and or emotional disturbance and not from mental retardation, sensory deprivation, or cultural or instructional factors (Kirk, 1962).

Also, American Psychological Association (2013) in its Diagnostic Statistical Manual of Mental Disorders (DSM-5) refers to it as specific learning disabilities and descriptively sees it as a type of Neurodevelopmental Disorder that impedes the ability to learn or use specific academic skills (e.g., reading, writing, or arithmetic), which are the foundation for other academic learning. The learning difficulties are 'unexpected' in that other aspects of development seem to be fine. Early signs of learning difficulties may appear in the preschool years (e.g., difficulty learning names of letters or counting objects), but they can only be diagnosed reliably after starting formal education. Specific Learning Disabilities (SLD) is understood to be a cross-cultural and chronic condition that typically persists into adulthood, albeit with cultural differences and developmental changes in the way the learning difficulties manifest. For example, in English-speaking countries, children struggle to learn the correspondence between letters and sounds to decode single words accurately, whereas adults may have mastered basic decoding skills but read slowly and with effort. By contrast, in countries with a non-alphabetic language or in which the correspondence between speech sounds of one's language and the letters used to represent those sounds is much simpler than in English, children with SLD (e.g., dyslexia) master letter-sound correspondence quickly, and both children and adults with SLD struggle with reading fluency. As mentioned earlier, there are more 40 definitions of learning disabilities, most professionals have expressed concerns on the argument for and against many definitions. Keogh (1990) opined that, it has heterogeneous background with not just a single condition and relates with various disciplines rather than trying to force the various attribute into a single, all-encompassing definition one should acknowledge that these characteristics reflect different types of learning disabilities. In all attempts to define learning disabilities, attention should be given to what is termed parameters of definition of the disabilities which include, heterogeneity, central nervous system dysfunction, psychological processing deficits, difficulty in academic tasks, uneven development pattern, disparity between potential and actual performance, significant difficulties and exclusion narratives (Osuorji, 2019).

Nature and Challenges of Learning Disabilities as field of Study

It has been established that exceptionality is two sides norm in any society although transability-willful acquisition of disability is emerging and trending in some part of developed world. One these sides is learning disabilities as special need condition and field of study. It is captured in by USA Presidential Committee on Excellent in Special Education as one the 13 categories of exceptionality. In its historical existence of 60 years, it has gone through many stages of development. Lerner and Kline (2006) traced its historical growth through three phases which spanned through 1800 to date, with each phase having specific features that overlaps with the next stage. These phases are, the foundation phase also christened as early brain research stage which covers from 1800-1930, the transition phase known also as clinic study of the child age which lasted from 19030-1960 and the integration phase which is seen also as implementation in schools spanning from 1960-date. Unique characteristics of these various stages are still reflecting in the contemporary practices in the field for instance, Kirk contributions remain valuable till date just like Grace Frenald prescription that child most preferred learning modalities auditory, visual and kinesthetic (AVKT) be considered in instructional presentations. The nature of learning disabilities makes it unique with very challenging implications to all concern stakeholders. There are many features, terms, causes etc that make it seemingly controversial for instance, handwriting variables like spacing, size, air time have been subject of

unending arguments in the field despite research efforts to address these concerns. As noted by Obani (2006), Fletcher et al (2007), Narris, Mammond, Williams and Walker (2020), learning disabilities is distinct base on the parameters highlighted below:

- It has not sensory evidence and hidden
- It is heterogeneous and cut-across different fields, culture etc
- It can occur concomitantly
- It manifests even with the present average or above average intelligence
- It is intrinsic to the individual and linked to CNS dysfunction

The above parameters and other related issues make disability prone to many challenges ranging from lop sided attention, misconception, gross neglect, lack of adequately trained specialists, uncondusive and stimulating environment, and poor attitudinal dispositions (Obani, 2006 & Orim, 2017). These challenges are briefly discussed below:

Lop sided attention: Learning disabilities has three sub-types, dyslexia, dysgraphia and dyscalculia, although none of these is more or less important than the other but attention in terms of research, identification-assessment, intervention and remediation is given more to dyslexia. The ratio of attention in area of research of these disabilities is 10:4:1 in favour of dyslexia, dysgraphia and dyscalculia. In Nigeria, there is dearth of research information in the last two categories of learning disabilities (Orim, Ikong & Anyati, 2022). The actions and inactions of specialists can be interpreted to mean that reading skill is more important than other skills like handwriting, maths and perception and a disorder affecting the skill should be promptly remediated. This situation suggests that learners with other disorders are left on their own without been identified and assessed so that early remediation can be provided.

Misconception of the Disability: Due to lack of sensory or physical evidence of learning disabilities regular teachers, parents and the public do not see it as a special need condition. This very particular about dysgraphia as they are many people in the society who hold fast to belief it not a disability but a mere lack of seriousness by the child. Obani (2006) lament the situation where children with these disabilities are tagged lazy and unserious. This misconception is responsible for the public narrow sense of the concept of disability which is limited only those with hearing, visual and physical impairment which result into disability.

Gross Neglect of Learning Disabilities: As result of the misconceptions even among government there is no political will in terms of policy formulation, implementation and funding. This seems to be a general problem of special needs education Nigeria but learning disabilities is the worst hit among categories of exceptionalities. Research in the field are not funded, one way to kill a discipline is to stop research and it will gradually have obsolete knowledge, disconnected from global trends and constitute stagnant research water.

Lack of Adequately Trained Specialists: Experience over the years has shown that despite the high prevalence of the disability in schools there are no adequately trained specialist to meet both educational and psychological needs of children with learning disabilities. The situation can be traced to deficit in the design of training programmes in special needs education department in some tertiary institutions in Nigeria. This trend has potential threat to national development and implementation of educational policies such inclusion, Universal Basic Education, Sustainable Development Goals etc.

Unconducive and Unstimulating Environment: As noted earlier, both research and learning environments are not stimulating enough to attract ground breaking research that will lead to development in the field of learning disabilities. This also affect teaching-learning process and the environment as there are lack didactical materials and tech-tools for quality instruction for meaningful learning.

Poor Attitudinal Dispositions: Attitudinal problem is a general issue in special needs education. Learning disabilities has its own share and even more due the lack of awareness on the disability. What people fail to understand about this disability is that it is hidden and most often it is not recognized and any problem that seemingly cover up with have more devastating effect than the one that is seen and give prompt attention. There is no doubt that this and other challenges have their differential and composite implications on the development and practice in learning disabilities especially in developing society like Nigeria. This result to what this paper described as sweeping and mere mentioning approach to special education generally and learning disabilities in particular.

Why Learners with Learning Disabilities find it difficult to Learn?

It is evidently clear that learners with these disabilities have hard time learning and using core skills to cope with school related tasks despite the presence of average or above intelligence. These difficulties are in most cases are not experienced only in core academic areas and skills but also in other areas require for functioning generally in the society. This has been and remain a source of concern to parents and teachers alike hence the need to explain why these difficulties exist. While it is truth that there are some factors such as poor pedagogical strategies, deficit professional training, weak knowledge of subject matter etc that can have corresponding effect on learners' school performance, research and conceptual frame of learning disabilities excused these factors from been responsible for the difficulties.

However, a critical surf of some definitions of this disability indicates that there are neurological disorders that affect the brain's ability to receive, process, store and respond to information (Pierangelo, & Giulian, 2006). Warner (1973) also observed that the disorder involves the psychological processes which has to do with input (ability to receive information), memory(which refers to ability to store and retrieve information in a logical and meaningful manner), integration/association (involves comparing, changing, enlarging, uniting, relating, combining or any means to make information more complete) and output (using information normally and meaningfully. Findings of Horowitz, Rawe and Whittaker (2017), Colker, Shaywitz, Shaywitz and Simon, (2012), Cavendish, (2013) revealed that any child who has deficit in the above areas is most likely going to experience difficulties learning in school because these are part of the functions of the brain that enhance learning. In addition to the above, Pierangelo, and Giulian, (2006), and Obi, Orim, Egaga (2014) advanced many reasons to explain why these children find it difficult to learn. These reasons are grouped into three as below:

Person-centered related factors: These are factors or reasons that can be traced to those with learning disabilities. The presence of disability generally brings psychological issues for instance, a student who consistently perform poorly due the challenge impose by dysgraphia will suffer from handwriting arrest and consequently have poor self-concept, frustration and scolionophobia (fear of school) and any task that involves handwriting. Previous failure experiences hunt students with learning disabilities, each time he or she tries to make new

attempt past experiences and self-held belief of failure make him/her to reason and act in pessimistic way. Orim, Orim and Unimuke (2023) indicates that dyslexics and dyscalculics unlike those with sensory disabilities prone to learned helplessness, low level of tolerance for stress and difficulties as well as withdrawal syndrome.

Nature of the disability: Learning disabilities among others has heterogeneous and concomitant nature. The implication of this is that it has multi-dimensional presentations and effects on individuals. More specifically are the characteristics such as perseveration, perception, visual, auditory, kinesthetic discrimination, organizational problem, distractibility, cognitive disorder, motor deficit, figure ground disorder etc. Studies in neuroimaging including Jack and Elena (2018) indicated dysfunctional central nervous system may cause disconnection in neurotransmitters that are responsible for carrying and interpreting information for appropriate actions or responses. It may equally lead to poor perception for example, a child with perceptual disorder can see p as b, 6 as 9, saw as was, u as n or v etc how can such a child learn to spell simple words with such letters?. Discrimination skills may even be a challenge to their ability to learn. As Eyo and Nkanga (2020) observed, 80% of children with these characteristics experienced sever difficulties learning in school.

Learning strategies: In pedagogical enterprise, good teaching strategies are very important but a good teacher feels more accomplished when children have learnt. This means that children should develop and use unique and effective learning strategies that can enhance their learning process and improved learning outcome. Unfortunately, those learning disabilities lack this capacity just as they have no cognitive and metacognitive strategies that help them to acquire new ideas, concepts, skills and how to store, process, retrieved and use information meaningfully for required purpose(s). Egaga, Orim, Olayi, and Ewa (2010), Orim and Udie (2023) note that learning process and the child are central activity/part of school thus, children need learning strategies that will reinforce their efforts to learn in order to match their potentials with achievements. Until they develop, use and master effective learning strategy(ies) they will continue to experience such difficulties in school.

Still on attempts to explain difficulties experienced by clients with learning disabilities Lev Vygotsky concept of zone of proximal development (ZPD) as articulated in his socio-cultural constructivist learning theory (1896-1934) provide further insight into the problem. ZPD is a gap between actual competence level (level of problem a learner is able to solve independently) and the potential development level (level of problem a learner could solve with the assistance or guidance from teacher as MKO). Santrock, (2001), Nurfaidah, (2018), defined it as the range of tasks that are too difficult for children to learn and master on their own but can be learned with guidance and assistance from adults or more skilled children. In the ZPD three sub-zones are identified, zone one has task(s) that a learner can independently perform, zone two has task(s) that learner can only do if she gets assistance and zone three has task(s) that are currently unreachable or beyond the learner (Crawford, 1996, Newman & Latifi 2020). Those with learning disabilities find difficulty to because learning tasks are not properly situated in each learner ZPD. More so, what is taught is not well programmed to progress orderly along the three sub-zones of ZPD as such the process becomes very tasking and challenging to extent that it over stretches their cognitive limit of learning a particular content. Peters (2017), James and Orim (2018) explained that the inability of most teachers to identify each child ZPD to plan,

implement, and evaluate teaching-learning process appropriately is one of the paramount reasons why children with learning disabilities experience difficulties in some academic areas.

Research and experience have also indicted systemic challenges associated with Nigerian school system such as misconception of the disability by teachers, school administration and parents, poor staffing, assessment related issues, and other didactical variables. Obani, (2006) in line with NJCLD agreed that although these factors have no causer link with the disability however, their contributions to challenges experienced by clients with learning disabilities are not unnoticed.

Despite difficulties persons with learning disabilities experienced, the disability is not an end in itself but a means to greatness with proper psychological adjustment. This has been proved by achievements of some eminent persons who had some forms of learning disabilities such as Nelson Rockefeller, Thomas Edison, Albert Einstein among others. What is important is the ability of parents, school and other stakeholders to brace up to their role by providing appropriate professional remediation and therapeutic learning environment complemented with technology for holistic development of children with these disabilities.

Information Processing Theory Perspective

Information processing theory is an attempt by cognitive psychologists to explain how information is processed. It is based on how human beings receive and process stimulus from the environment into meaningful actions. Çeliköz, Erişen, & Şahin, (2019) note that, George Armitage Miller was the first to conceived the idea about this theory. The effort was further complemented by the work of John William Atkinson and Richard Shiffrin. As cognitive psychologists, their focus was to explain the human brain mechanisms and its functions as it relate to learning. They posited that, the mechanisms are relatively simple and seamless but the magnitude and scope of neural networks and their behaviors are quite complex and powerful to the extent that any deviation may affect the whole learning process (Langley, 2016; Wang, Liu, Amp & Wang, 2003). Like others, Kmetz, (2020) explains that the process uniquely begins with receiving input, also called stimulus from the environment using various senses. The input is then described, process and stored in the memory, which is retrieved when needed. The mind or the brain is likened to a computer that is capable of receiving, analyzing, storing and retrieving information with appropriate command. In the word Langley (2016), the analogy between computer and the human brain gives a better explanation on how information is process in learning process.

As a theory with more than one proponent and with potentials to be applied in various work settings, different stages information passes through have been identified. Goldstein and Mackewn, (2005) and Atkinson and Shiffrin (1977) identified four stages of, sensory memory, short-term memory often known as working memory and long-term memory while Kmetz (2020) proposed four levels of processing which are, acquisition, storage, transformation and transmission. The two models of information processing models are adapted and subsumed into four multi-store stages to enhance the understanding of how any distortion in these stages can affect learning. They are briefly explained below:

Information stage: This stage is concern with the natural state of information and its source. This can also be seen as a stage of seeking or acquisition of information which can originate from outside the organization through other entities, third-party experts, peer tutor, teacher, clubs and other related sources. In pedagogical setting, it could be seen as stimulus from learning

environment and in organization it may be given as policy directive or idea from a particular source. Information cannot be processed without it emanating from a given source (s), at this level it may be raw or refined. In any case, the learner or worker has responsibility to work on it to facilitate the process at the input stage. It is important to note that this first stage in the process is critical as other stages depend on it. Chen and Lin (2016) stated that an in-depth understanding of information either in classroom or industry enhance input process and expand activities of the organization as well as reduce uncertainty such failure in the classroom.

Input stage: At input stage, information which may come as instruction is received through different sensory modalities such as such as visual, olfactory, or auditory, hearing organs is encoded. This is why Grace Frenald proposed the use of auditory, visual and kinesthetic (AVKT) model in teaching children with learning disabilities. This means a child is takes advantage of any or all of these organs to receives and appreciate stimulus from learning environment. Atkinson and Shiffrin, (1977) opined that these sense organs often receive a barrage of stimuli most time however, some are filtered out by the mind and forgotten to prevent getting overwhelmed. What is not filtered out gets the attention of the mind, it is transferred to the next stage for processing.

Processing stage: Processing stage mainly takes responsibility of storing what has been inputted. It takes place within the short and long-term memory. In some models, the short and long-term phase are separated but, in this model, they are seen as one because the task at this stage is basically the same except short-term holds information for a short while for easy retrieval and immediate usage while the long-term memory gets and process stimulus from STM to be stored for long time and can as well be retrieved at later time for different purposes. Çeliköz, Erişen, and Şahin, (2019) reports that long-term memory does this due to unlimited amount of space it has and various methods are used to store information in the long-term memory such as repetition, connecting information, relating information to meaningful experience or other information, and breaking up the information into smaller chunks. This stage is also important for learning as children can learn and solve a problem from its past experiences through the stored information. Most children with learning disabilities and other neuro-developmental disorders have severe problems with processing information which is of course of the core issues in learning difficulties (Adeleke et al, 2020).

Output stage: The output stage is critical as others because it involves retrieval and using what has been acquired, inputted and processed. Warner (1973) explains that output is mainly concern with using information normally and meaningfully. In teaching-learning process and situation this entails the usability of what is learnt through written, spoken language, performance of practical task like riding bicycle, drawing, skipping etc. It is important to stress that this stage just like others do not function exclusively independent as each stage rely on the other for proper functioning of the model. It also means that if there is an issue with in any stage the whole information may not be properly processed.

Relatedness of the theory to learning disabilities as a special need condition

The information processing theory as propounded has different models of explaining how stimulus are received, processed and used. The theory and its models provide once and for all approach to understanding learning disabilities and why children with these disabilities experience undue difficulties learning in a typical way like peers. Cognitive psychology through

the theory succinctly explains how learning takes place and CNS model of learning disabilities further confirmed that a dysfunction in the cognitive process effect how and what a child learns. From the theory perspective, it is instructive to know that learning starts and flows through the four stages. Connectivity of these stages implies that a child with problem in one stage will have issue in others. For instance, a child with memory deficit may seek, acquire information and input same but cannot process and retain it in the memory to be retrieved when appropriate. In a more simply way, the theory and learning disabilities rely on cognitive processing of learning activities as information through different stages irrespective of the model. Warner (1973) advance that learning disabilities involve psychological processes of input, memory, integration and output. The study explains these processes beginning with input as receiving of information using various sensory modalities. Memory is seen as the storing and retrieving of information in a logical and meaningful way. While integration and output involve associating, combining, relating, enlarging information to render it more complete just like output is concern with using information normally and meaningfully. What seems like a mystery in learning disabilities is that it interferes with perception, memory, processing, and output. This is why Obani (2006), Kirk (1962) and Warner (1973) posit that any disorder (s) that occur in one or more of these psychological processes and stages of information processing result to disabilities that affect learning even when the child has average or above average intelligence. The relatedness becomes more obvious when you consider what they have in common such as:

- They involve the process of learning activities and information.
- Cognitive ability is central to theory and learning disabilities.
- The brain mechanism and it functions seemingly host both the theory and the disability.
- Dysfunction in stages affect the child learning process.
- Technology can mitigate any disorder(s) in both the flow and processing of information in the theory and effect of learning disabilities.
- Pedagogical strategies like repetition and chunking can be sourced from the theory as remediation strategies for learning disabilities.

Conclusion and Recommendations

Learning disabilities is as old as mankind. However, it was so christened in the early 60s by Samuel Kirk. This brought a temporary relief on issues associated with it but within 60 years of its existence, there is a still a growing concern of how best to explain and understand the disability due its nature and manifestation. The misery of the disability is felt mostly in academic domains to extent that even with above average intelligence the child still performs atypical with peers and educational level. Like most disciplines, it is plagued with challenges compounding parents and students worries about how those with disability learn and why they have undue difficulties learning.

Models, principles have not been able succinctly address this concern hence the use of information processing theory in their discourse an attempt to demystified the task of understanding the special needs condition and why those with the disability finds it difficult to learn. From the theoretical perspective any distortion due to disorder in the flow of information through it stages result to learning disabilities. Cognitive psychologists believed that acquiring information, inputting, processing and it through the output mechanism is critical to the learning process and this is genesis of learning disabilities. The paper therefore recommends that,

- Teachers, parents and school administrators should be properly educated through workshops, conference, seminars etc the root causes of the disability
- Technology should be immersed in pedagogy of children with learning disabilities
- Cognitive psychological principles and models of learning be used based on research evidences.
- Practice-based collaboration among relevant professionals should be conceived and implemented to improve education and related services delivery to children with learning disabilities.

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