International Journal of Contemporary Issues in Social Sciences
Volume 3, Issue 1, 2024 ISSN(P):2959-3808 | 2959-2461

ROLE OF INSTRUCTIONAL TECHNOLOGY IN PROMOTING STUDENTS' MOTOR SKILLS AT SECONDARY SCHOOL LEVEL: AN ANALYSIS

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Received: 13 January, 2023 **Revised:** 16 February, 2024 **Accepted:** 22 February, 2024 **Published:** 28 February, 2024

ABSTRACT

The study entitled, "Role of Instructional Technology in Promoting Students' Motor Skills at Secondary School Level: An Analysis". Research objectives were to analyze the role of instructional technology in promoting students' motor skills. The study was survey and descriptive in nature. The quantitative as well as qualitative (QUAN-qual.) method was adopted. The explanatory sequential technique was used. Population of the study was comprised: Head teachers, secondary school teachers and students of secondary classes. The cluster random sampling technique was adopted. The sample of study consisted of 16 head teachers, 64 secondary school teachers and 320 students of secondary classes of public sector secondary schools. The total sample was consisted of 400 including head teachers, secondary school teachers and students of secondary classes. The questionnaire was developed for quantitative data collected from head teachers, secondary school teachers and students while the interview was developed for qualitative data collected from head teachers. The validity was ensured through expert opinion and the reliability was calculated through Choron Batch Alpha through SPSS-24. Findings of the study were 56% of head teachers, secondary school teachers and students agreed that promoting motor skills through instructional technology and 28% of head teachers, secondary school teachers and students were strongly agreed, while 5% of head teacher, secondary school teachers and students were disagreed and 1% of head teacher, secondary school teachers and students were strongly disagreed, whereas 10% of head teacher, secondary school teachers and students were undecided with the given statement. Collectively, majority 84% (56%+28%) of head teacher, secondary school teachers and students agreed that promoting motor skills through instructional technology. Mean score 4.06 and standard deviation 0.759 supported. The study concluded that majority of head teacher and secondary school teachers were promoting motor skills in students of matric through instructional technology. Mean score and standard deviation supported. The study recommended that head teachers and secondary school teachers may promote motor skills in students of matric through instructional technology.

KEYWORD: Instructional technology, Motor skills, Secondary school teachers, public sector.

INTRODUCTION

The instructional technology comprises educational field dedicated to systematic exploration of instructional design and development. The central objective of instructional designers is to craft compelling and efficient learning encounters. The various models, such as ADDIE, Backward Design and ASSURE are employed in this pursuit (Begam

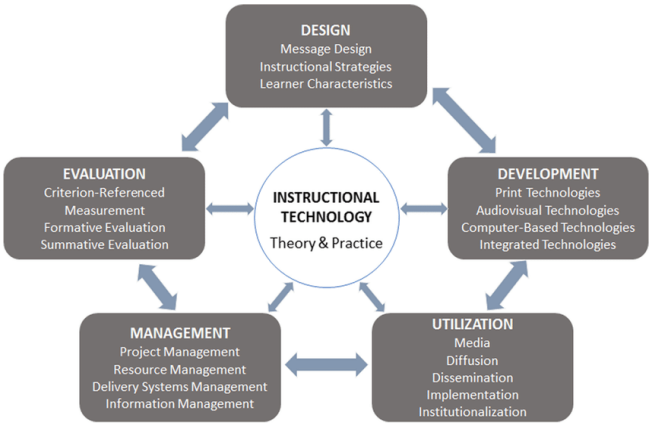
& Tholappan, 2018). Instructional technology encompasses the principles and application of creating, executing, and overseeing technological tools within educational settings. Educational technology comes in diverse forms, each with a distinct purpose, yet all share a common goal: to streamline the process of teaching and learning (Bastable, 2021). Among the frequently utilized technologies in classrooms are the use of various equipment, hardware, software tools, integrated multimedia, integrated learning systems, distance learning, audio and video conferencing, virtual reality (Bento & Dias, 2017). Instructional technology theories encompass various approaches and frameworks that guide the design and use of technology in educational settings (Perryet al., 2022). Some of the major learning theories that shape modern conversations surrounding technology integration include behaviorism, constructivism, connective-ism, cognitive Load Theory, Media Ecology, TPACK (Technological Pedagogical Content Knowledge), SAMR Model (Substitution, Augmentation, Modification, Redefinition) and Andragogy.

a. **Behaviorism:** Focus on using technology to reinforce desired learning behaviors through positive reinforcement and immediate feedback.
b. **Constructivism:** Emphasized active learning, where learners construct knowledge and meaning from their experiences, and technology supports collaborative learning and problem-solving.
c. **Connectivism:** Relate to learning as networked connections, where technology facilitates accessing and sharing information from diverse sources.
d. **Cognitive Load Theory:** Deals with the mental effort involved in learning, suggesting that technology should be designed to manage cognitive load effectively.
e. **Media Ecology:** Examines the impact of technology on the learning environment and how it shapes communication and knowledge exchange.
f. **TPACK (Technological Pedagogical Content Knowledge):** Integrate technology, pedagogy, and content knowledge for effective teaching and learning with technology.
g. **SAMR Model (Substitution, Augmentation, Modification, and Redefinition):** Describe levels of technology integration in education, from simple substitution to transformative redefinition.
h. **Andragogy:** Focus on adult learning and the effective use of technology to support the unique needs and motivations of adult learners.

The primary categories of instructional technology encompass software tools, software varieties, integrated learning systems, equipment utilization, multimedia incorporation, audio and video conferencing, distance education, and classroom arrangements (Libertus & Violi, 2016).

The field encompasses five fundamental domains: design, development, application, administration, and assessment. These terms encompass both the realms of knowledge and the roles executed by experts within the field. Within each domain of Instructional Technology lies a reservoir of knowledge derived from both research and practical experience (Glazewski & Ertmer, 2020).

Figure 01:
Instructional Technology Theory and Practice.



Psychomotor development facilitates a child's motor, social, emotional, and cognitive development, making it easier for them to adapt to new learning approaches at all stages of early childhood development (Newell, K. M. J. J. o. M. L., & Development., 2020). To explain the sequence and timing of early motor development, let us briefly examine three theoretical positions: the maturation hypothesis (Egilea, Urtea, and Gesell, 1928), the experience hypothesis (Dennis, 1960), and a more recent one: the dynamical systems theory (Kenrick, 2001; Smith & Thelen, 2003).

Berruezo (1996), as cited in Ardanaz (2009), highlights the paramount importance of psychomotricity in a child's developmental journey, emphasizing the need to address it comprehensively across all domains to nurture their increasing independence in movement. Similarly, Pacheco (2015) characterizes psychomotor skills as a realm of knowledge focused on studying and comprehending phenomena linked to bodily movement and its progression.

Psychomotor development unfolds through four distinct stages: infancy, childhood, adolescence, and adulthood (Crompton & Sykora, 2021). Within each of these stages, individuals undergo a multitude of transformations, encompassing both physical and cognitive aspects, which enable their growth and maturation to effectively interact with the surrounding world. In the context of infancy, psychomotor development involves:

1. **Communicative development:** By 3 months of age, a child should be able to make cooing sounds, smile at people, and utilize different cries for different needs. At around 9 months old, a child will begin pointing to objects.

2. **Socio-emotional development:** At 1 month old, infants will be able to respond to calming actions when they are upset. By 3 months of age, your child should startle at loud sounds and smile or stop crying when hearing a familiar voice. By 9 months old, infants will begin to display stranger anxiety and look to parents for comfort.
3. **Cognitive Development:** At 1 month old, children will begin to recognize their parents' voices and will eventually begin turning their heads towards sounds. By 9 months of age, they will have developed object permanence, which is when babies understand that objects continue to exist even if they can't see or hear them (McLeod, 2011).
4. **Childhood:**
The developmental stage of children begins at 1 year of age and lasts until the age of 10. During this stage, children experience numerous developmental changes including physical growth and development, communicative development, and cognitive development (Kumar et al., 2018).

5. **Physical growth and development:** While the posterior fontanel, or soft spot on the skull, usually closes between 6 and 8 weeks of age, the anterior fontanel will not close until the child is between 12 and 18 months old. By the age of 1, a child should have tripled his birth weight and will continue to gain weight and height following a regularly tracked growth pattern (Love & Washburn, 2022). Latent Learning. In Encyclopedia of Animal Cognition and Behavior (pp. 3887-3892): Springer.

During the childhood years, the child will also develop the ability to walk, run, hop on one foot, and skip among other

newly emerging skills including the hand-eye coordination necessary for skills such as writing (Jose, Patrick & Moseley, 2017). Children in this stage will also lose their baby teeth and adult teeth will begin to emerge.

6. **Communicative:** By 1 year of age, children will be able to mimic animal sounds and speak a few simple words, but they will quickly grow their vocabulary to over 100 words by the age of 2. Over the next several years, the child will develop the communication skills necessary to form friendships with others.

7. **Cognitive:** At one year of age, a child will begin to understand simple commands and the uses of common objects. Over time, the child will begin exploring and make-believe play will increase. By 4 years of age, a child will begin to understand the concept of time and become more aware of other people around him. Children will have the ability to obey the rules that have been put in place but do not understand right from wrong. Children in later years of this stage will be able to read, write, and understand the concepts of math and special awareness (Huang, 2019).

RESEARCH OBJECTIVES

Objectives of the study were:

- To understand the insights of students' motor skills at secondary school level
- To analyze the role of instructional technology in promoting students' motor skills

RESEARCH QUESTIONS

Research questions of the study were:

1. What are the insights of students' motor skills at secondary school level?
2. What is the role of instructional technology in promoting students' motor skills?

METHODODOLOGY

In this part of research, the researcher describes the methods and materials which he/she has used in conducting his/her research (Shahid & Ali, 2017; Rao, et al., 2023). The design of present study was survey and descriptive in nature. "Research design covers the entire method used by the researcher in the research" (Ahmad, Farhat, & Choudhary, 2022). The quantitative as well as qualitative (QUAN-qual) method were adopted and the explanatory sequential technique was used. "The population is defined as a set of individuals, data, or items from which a statistical sample is taken" (Younus, Farhat & Ahmad, 2023). Population of the study comprised; head teachers (HT), secondary school teachers (SSTs), students of secondary classes (SSCs). The stratified sampling technique was adopted. The sample, sampling and sample size of study comprised; sixteen (16) secondary school heads, sixty-four (64) secondary school teachers, three hundred and twenty (320) students of secondary classes with the same ratio of gender and locality. "Instrumentation preforms vital role in research methodology in collecting precise data" (Ahmad, Sanober & Cheema, 2024); consequently, as instrument questionnaires were developed for data collection from head teachers, secondary school teachers and students of secondary classes. The validity of questionnaire was ensured through expert opinion and reliability was calculated through SPSS-24 by Cronbach' Alpha. The researcher personally visited the selected schools and collected the data.

DATA ANALYSIS

The collected data was analyzed through SPSS-24 using percentage, frequency, mean score and standard deviation as follows:

Table:01
Promoting Motor Skills in Students through Instructional Technology.

Items	Stat.	SDA	DA	UD	A	SA	Total	SD	Mean
Item-1	F	22	38	26	214	100	400	0.861	3.91
	%	2%	9%	6%	62%	21%	100%		
Item-2	F	17	50	32	203	98	400	0.78	4.01
	%	2%	5%	9%	58%	26%	100%		
Item-3	F	6	33	35	223	103	400	0.740	4.12
	%	1%	4%	9%	56%	30%	100%		
Item-4	F	11	41	18	229	101	400	0.624	3.98
	%	1%	5%	5%	74%	15%	100%		
Item-5	F	11	40	30	222	97	400	0.656	3.98
	%	1%	5%	6%	70%	18%	100%		
Item-6	F	9	46	45	195	105	400	0.75	4.05
	%	1%	5%	9%	58%	27%	100%		
Item-7	F	7	45	36	217	95	400	0.75	4.01
	%	1%	4%	12%	59%	24%	100%		
Item-8	F	11	42	70	154	123	400	0.873	4.00
	%	1%	5%	20%	42%	32%	100%		
Item-9	F	6	40	31	191	132	400	0.738	4.2
	%	1%	4%	7%	52%	36%	100%		
Item-10	F	12	25	54	170	139	400	0.824	4.21
	%	1%	3%	14%	39%	43%	100%		
Item-11	F	5	29	46	173	147	400	0.758	4.2
	%	1%	3%	11%	48%	37%	100%		
Total	F	117	429	423	2191	1240	4400	0.759	4.06
	%	1%	5%	10%	56%	28%	100%		

The above table presents factor.1 promoting skills through instructional technology. Item.1 the data shows that 62% of head teachers, secondary school teachers and students agreed about enhancing learners' static strength for maximum working through instructional technology, while 21% strongly agreed, 9% disagreed, and 2% strongly disagreed, whereas 6% undecided with the given statement. Collectively, majority 83% (62%+21%) agreed that they enhanced learners' static strength for maximum working through instructional technology. Mean 3.91 and standard deviation 0.861 supported. Item.2 the data shows that 58% of head teachers, secondary school teachers and students agreed about enhancing learners' dynamic strength for maximum movement through instructional technology, while 26% strongly agreed, 5% disagreed, and 2% strongly disagreed, whereas 9% of respondents were undecided. Collectively, majority 84% (58%+26%) agreed that they enhanced learners' dynamic strength for maximum movement through instructional technology. Mean 4.01 and standard deviation 0.78 supported. Item.3 the data reflects that 56% of head teachers, secondary school teachers and students agreed about encouraging learners' sensory feedback to provide relevant information to mind through instructional technology, while 30% strongly agreed, 4% disagreed, and 1% strongly disagreed, whereas 9% were undecided with the statement. Collectively, majority 86% (56%+30%) agreed that they encourage learners' sensory feedback to provide relevant information to mind through instructional technology. Mean score 4.12 and standard deviation 0.740 supported. Item.4 the data highlights that 74% of head teachers, secondary school teachers and students agreed about promoting adaptive skills to enhance learning through instructional technology, while

15% strongly agreed, 5% disagreed, and 1% strongly disagreed, although 5% of respondents were undecided. Collectively, majority 89% (74%+15%) of respondents agreed that they promote adaptive skills to enhance learning through instructional technology. Mean score 3.98 and standard deviation 0.624 supported. Item.5 the data indicates that 70% of head teachers, secondary school teachers and students agreed about correlating learning outcomes with the duration of rewarded practice through instructional technology, while 18% strongly agreed, 5% disagreed, and 1% strongly disagreed, whereas 6% undecided. Collectively, majority 88% (70%+18%) agreed that they correlate learning outcomes with the duration of rewarded practice through instructional technology. Mean score 3.98 and standard deviation 0.656 supported. Item.6 the data depicts that 58% of head teachers, secondary school teachers and students agreed about using latest pedagogies to promote learning through instructional technology, while 27% strongly agreed, 5% disagreed,and 1% strongly disagreed, however 9% undecided. Collectively, majority 85% (58%+27%) agreed that they used latest pedagogies to promote learning through instructional technology. Mean 4.05 and standard deviation 0.75 supported. Item.7 the data illustrates that 59% of head teachers, secondary school teachers and students agreed about using maximal strength to achieve learning task through instructional technology, while 24% strongly agreed, 4% disagreed, and 1% strongly disagreed, whereas 12% undecided. Collectively, majority 83% (59%+24%) agreed that they used maximal strength to achieve learning task through instructional technology. Mean score 4.01 and standard deviation 0.75 supported. Item.8 the data affirms that 42% of head teachers, secondary school teachers and students agreed about using explosive strength for learning responsive ability through instructional technology, while 32% strongly agreed, 5% disagreed, and 1% stronglydisagreed, whereas 20% undecided. Collectively, majority 74% (42%+32%) agreed that they used explosive strength for learning responsive ability through instructional technology. Mean score 4.00 and standard deviation 0.873 supported. Item.9 the data describes that 52% of head teachers, secondary school teachers and students agreed about promoting strength endurance for improving the ability to do activities through instructional technology, while 36% strongly agreed, 4% of respondents were disagreed, and 1% strongly disagreed, while 7% undecided. Collectively, majority 88% (52%+36%) agreed that they promoted strength endurance for improving the ability to do activities through instructional technology. Mean 4.2 and standard deviation 0.738 supported. Item.10 the data shows that 43% of head teachers, secondary school teachers and students strongly agreed about adopting extrinsic feedback to provide guidance to learners through instructional technology, while 39% agreed, 3% disagreed, and 1% strongly disagreed, whereas 14% undecided about the statement. Collectively, majority 82% (43%+39%) of respondents agreed that they adopt extrinsic feedback to provide guidance to learners through instructional technology. Mean score 4.21 and standard deviation 0.824 supported. Item.11 the data reflects that 48% of head teachers, secondary school teachers and students agreed about adopting intrinsic feedback to helplearners to be focused on the skill, while 37% of respondents were strongly agreed, 3% of respondents were disagreed, and 1% of respondents were strongly disagreed, however 11% of respondents were undecided with the given statement. Collectively, majority 85% (48%+37%) of respondents agreed that they adopt intrinsic feedback to help learners to be focused on the skill. Mean score 4.2 and standard deviation 0.758 supported the statement. Collectively, data presents that 56% of head teachers, secondary school teachers and students agreed factor promoting motor skills through instructional technology, while 28% were strongly agreed, 5% were disagreed, and 1% were strongly disagreed, whereas 10% of head teacher, SSTs and students were undecided with the given statement. Overall, majority 84% (56%+28%) of head teacher, secondary school teachers and students of secondary classes agreed that they were promoting motor skills through instructional technology. Mean score 4.06 and standard deviation 0.759 supported.

DISCUSSION

The study focused the students' physical movement through instructional technology. It was explored that secondary school teachers increased their speed of physical activity through instructional technology. As Best (2011) discussed that majority of respondents agreedthat they used accurate pedagogy for effective teaching learning process through instructional technology. Similarly, Michal (2015) stated that secondary school teachers adopted flexible teaching strategy through instructional technology, they ensured balance of content with activities through instructional technology, they minimized communication gap of teacher and students through instructional technology, they assigned intellectual activities during learning process through instructional technology, they made perceptions as per SLOs through instructional technology, they transmitted visual information in learning process through instructional technology, they emphasizedverbal ability of learners in learning process through instructional technology, they promoted learners responsive skill through instructional technology, they included exergaming for learners' fitness through instructional technology, they applied Kinesthetic Learning Apps to involve learners physically, they took active breaks through physical and mental exercises to recover energy and they used gamified learning platforms for higher order learning through instructional technology, they preferred physical computing for interactive learning in the classroom.

CONCLUSION

The study concluded that secondary school teachers increasedtheir speed of physical activity through instructional technology, used accurate pedagogy for effective teaching learning process through instructional technology, adopted flexible teaching strategy through instructional technology, ensured balance of content with activities through instructional technology and minimized communication gap of teacher and students through instructional technology, assigned intellectual activities during learning processthrough instructional technology. Further it was concluded that secondary school teachers made perceptions as per SLOs through instructional technology, they transmitted visual information in learning process through instructional technology, they emphasized verbal ability of learners in learning process through instructional technology, they promoted learners responsive skill through instructional technology, they included exergaming for learners' fitness through instructional technology, they applied Kinesthetic Learning Apps to involve learners physically and they took active breaks through physical and mental exercises to recover energy, they used gamified learning platforms for higher order learning through instructional technology and they preferred physical computing for interactive learning in the classroom.

RECOMMENDATIONS

- The instructional technology may be used during teaching to increase the psychomotor development of students at secondary level. The role of instructional technology is very significant in physical movement of the learners.
- The instructional technology may be applied during activities and role play to increase speed of physical activity of students. The instructional technology must use to increase speed of physical activity of students atsecondary level.
- The instructional technology may be used in Exergaming to increase the fitness of students. The instructional technology plays very important role in Exergaming for learner's fitness.
- The instructional technology may be accessed for help in taking active breaks for physical and mental exercises to recover energy.
- The instructional technology may be used for taking active breaksfor physical and mental exercises to recover energy.
- The instructional technology may be applied by interactive learning modules and software's.
- The students can acquire and hone particular psychomotor abilities following step by step instructions provided by technology.

- The instructional technology may be promoting coordination among students. The instructional technology must be used to promote coordination among students at secondarylevel.
- The instructional technology may be used to promote eye-hand coordination among students.
- The instructional technology may be used to promote eye-hand coordination of students at secondary level.

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