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Quasi experimental study to assess the effectivenss of planned teaching program on knowledge regarding artificial intelligence among adolescents in selected schools of district Kangra, Himachal Pradesh

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Abstract

Artificial intelligence has emerged as a revolutionary technology in recent decades, transforming fields such as education, healthcare, communication and daily life by enhancing and decision making. A quantitative research approach and quasi-experimental research design was used to conduct the study. Non probability convenient sampling technique will be used to select 60 adolescents of district Kangra, Himachal Pradesh. This study had shown that, (33.3%) adolescents were between the ages group 16-17years, (53.3%) were female, (58.3%) were from nuclear family, (70%) lived in rural areas, (36.7%) had a monthly family income of <20,000rs, (25%) had a private job and (25%) have Government job, (41.7%) had 2 siblings, (75%) were having parental involvement in their education, (80%) had internet access at home, (61.7%) used a smartphone to access internet, (63.3%) had heard about artificial intelligence, (73.3%) was interested in learning about artificial intelligence. The mean post- test knowledge score i.e. 70.33 was higher than mean pre- test knowledge score i.e. 33.47 at $p<0.001$ level of significance which shows the significant difference between mean pre-test and post- test knowledge sores regarding artificial intelligence.

Conclusion: The study demonstrated the effectiveness of planned teaching programme in enhancing knowledge and awareness about artificial intelligence among adolescents. As adolescents are having curiosity in learning new topics, they showed interest in planned teaching programme regarding artificial intelligence as well adolescents can gain a deeper understanding of the technology that surrounds them and develop essential skills for the future.

Keywords: Artificial intelligence, planned teaching programme

Introduction

Artificial Intelligence refers to the simulation of human intelligence in machines that are programmed to think and act like humans. It involves the development of algorithms and computer programs that can perform tasks that typically require human intelligence such as visual perception, speech recognition, decision-making, and language translation. Artificial intelligence has the potential to revolutionize many industries and has a wide range of applications, from virtual personal assistants to self-driving cars.

According to Digital Education Council found that globally 86% of students use artificial intelligence in their studies, with 24% uses daily and 54% by weekly. In India, according to a Microsoft study use of artificial intelligence in is 65% more than global average. 77% children use generative artificial intelligence for education purposes such as understanding topics, gaining general knowledge and completing homework and assignment.

Most of people hear the term artificial intelligence, the first thing they usually think of is robots. That's because big-budget films and novels weave stories about human-like machines that wreak havoc on Earth. But nothing could be further from the truth. Artificial intelligence is based on the principle that human intelligence can be defined in a way that a machine can easily mimic it and execute tasks, from the simplest to those that are even more complex. The goals of artificial intelligence include mimicking human cognitive activity.

According to a report by UNESCO (2022), integrating artificial intelligence literacy into school curricula is essential to prepare students for the future of work and digital citizenship. Early exposure to artificial intelligence concepts can help adolescents understand ethical implications, reduce fear of automation, and stimulate interest in STEM careers.

Governments and educational institutions are increasingly advocating for digital literacy programs. The National Education Policy (NEP) 2020 in India, for instance, emphasizes the integration of artificial intelligence in school education. Artificial intelligence in education frameworks, ensuring that teaching methodologies align with students' learning needs. It emphasizes the need for digital literacy, coding, and computational thinking from an early stage. While national education policy proposes including artificial

intelligence in school curricula, implementation is uneven across states and often delayed due to resource constraints and lack of trained educators.

Artificial Intelligence (AI) is fundamentally reshaping education. It addresses the limitations of traditional education methods by providing personalized learning paths tailored to each student's pace and style. This data-driven approach enhances engagement and learning outcomes. Moreover, artificial intelligence powered tools assist teachers, relieving them from administrative burdens and enabling focused guidance. While promising, ethical considerations and data privacy issues necessitate careful implementation. In essence, artificial intelligence integration in education is not only technologically groundbreaking but also pivotal in creating a learner-centric and efficient educational landscape.

Artificial intelligence powered learning platforms are undeniably the future of higher education, offering the potential to enhance academic achievement through personalized, efficient, and data-driven approaches. Institutions must invest not only in artificial intelligence technology but also in faculty development, ensuring educators can adapt to this new landscape. As artificial intelligence continues to evolve, its partnership with human educators will be key to unlocking the full potential of higher education.[18]

India's National Strategy for Artificial Intelligence, by NITI Aayog, is built on the philosophy of 'AI For All'. The approach is to leverage exponential technologies toward inclusive growth, develop population-scale artificial intelligence solutions for societal needs and leverage India's unique position to be a global leader for inclusive technologies. National Education Policy 2020 acknowledges the importance of Artificial Intelligence (AI) and emphasizes on preparing students for an artificial intelligence driven economy. An artificial intelligence driven economy requires rigorous programs and interventions to address current and future artificial intelligence skill gaps and empower a larger non-technical audience with artificial intelligence social skills and tech skills for real world applications.

Artificial intelligence is not just transforming the world - it is transforming what it means to be young in the 21st century. Artificial intelligence to resolve some of humanity's greatest challenges, these technologies also risk leaving the young, the poor, and the vulnerable far behind. We need to include young people in all conversations on artificial intelligence. The voices of young people must be at the heart of decision-making processes. Young people are not just passive users of artificial intelligence they are learners, creators, and future leaders. We need to reinforce their knowledge and critical thinking skills that will empower them to ask the right questions, critically evaluate society, and thoughtfully lead the way into the future. Artificial intelligence and digital literacy should be integrated into school curricula to foster critical thinking, bridge digital divides between regions and communities, and ensure access to essential tools and resources, particularly in low-income settings. Equipping young people with the right skills, protections, and opportunities is not just beneficial, it is necessary.

Objectives

1. To assess the pretest knowledge score regarding artificial intelligence among adolescents in selected schools of district Kangra, Himachal Pradesh.
2. To assess the posttest knowledge score regarding Artificial intelligence among adolescents in selected schools of district. Kangra, Himachal Pradesh
3. To compare the pretest and posttest knowledge score regarding artificial intelligence among adolescents in selected schools of district Kangra, Himachal Pradesh
4. To find out association between posttest knowledge score regarding artificial intelligence among adolescents with their selected socio demographic variables.

Operational definition: The operational definition for the present study

1. **Assess:** In this study, assess refer to organise systematic and continuous process of collecting data from adolescents regarding artificial intelligence among the adolescents.
2. **Effectiveness:** In this study, effectiveness refers to extent to which the planned teaching programme has achieved the desired effect of improving the knowledge regarding artificial intelligence among the adolescents.
3. **Planned teaching programme:** In this study, planned teaching programme is a systematically developed and structured educational plan prepared to educate, create awareness and enhance knowledge regarding artificial intelligence to among the adolescents
4. **knowledge:** In this study, knowledge refer to cognitive understanding of facts and information related to artificial intelligence among the adolescents.
5. **Artificial intellegence:** In this study, artificial intelligence refers to the branch of computer science that deals with the creation of systems or programs capable of performing tasks that normally require human intelligence, such as problem- solving, decision making. It includes basic concepts, significance, importance, benefits, advantages, disadvantages.
6. **Adolescents:** In this study, adolescence refers to subject between the age group 12- 19 years in selected schools of district Kangra, Himachal Pradesh.

Methodology

Research Design: Research design is the master plan specifying the methods and procedures for collecting and analysing the needed information in research study.

Pre-experimental "one-group pre- test and post-test design"

Research Variables

Variables are qualities, properties or characteristics of person, things or situation that change or vary.

Independent Variables: It is a stimulus or activity that is manipulated or varied by the researcher to create the effect on the dependent variable.

In this study, independent variable is planned teaching programme.

Dependent Variable: It is the outcome or response due to

the effect of the independent variable, which researcher wants to predict or explain.
In this study, dependent variables are knowledge of adolescents regarding artificial intelligence.

Socio Demographic Variables: It is characteristics, attributes of the study object.

Research setting: The present study was conducted at selected schools of district Kangra, Himachal Pradesh.

Population: The population of the present study was adolescents of district Kangra, Himachal Pradesh

Target Population
The entire population in which the researcher is interested and to which they would like to generalize the research findings.
In this study the target population is adolescents of age group 12 to 19years.

Accessible population: In the present study accessible population is adolescents who are interested in my study and full fill the inclusion criteria in selected schools of District Kangra, Himachal Pradesh

Sapmle and sampling technique
Sample
Sample consists of unit which comprise the population selected by investigator or research to participate in their research project.

In this study the sample was all adolescents
Sample Size: Sample size refers to the number of participants or observation includes in the study.
In this study the sample size was 60 adolescents.

Sampling Technique
The process of selected sample from the target population to represent the entire population.
Non probability convenient sampling technique was used to select 60 adolescents in selected area of district Kangra, Himachal Pradesh.

Criteria for sample selection
Inclusion criteria: The study includes adolescents who were
- Willing to participate in the present study.
- Present on the time of data collection.
- Interested in learning about artificial intelligence
- Able to understands English and Hindi language

Exclusion criteria: This study excludes adolescents who were
- Not willing to participate in the study.
- Sick at the time of data collection.
- Not present at the time of data collection.
- Child less than 12 years or more than 19 years.

Selection and development of the tools
A tool is vehicle that could obtain data pertinent to the study and the same time adds to the body of general knowledge in the discipline. The tool was selected and developed according to the objectives of the study, previous review of literature like, books, journals, unpublished research studies, mass media and by discuss with guide and co -guide. The developed tool was refined and validated by subject experts and the guides. So, a self- structured knowledge questionnaire was used to assess the knowledge score among adolescents.

Description of tool
The tool was formulated after an extensive review of literature and discussion with the expert and guides.
The tool was consisting of two parts:

PART-1: Selected Socio demographic variable: It consists of selected socio- demographic variables to obtain personal and general information of adolescents. In this study, selected socio- demographic variables was:
Age (in years), Gender, Type of family, Area of residency, Monthly income (In Rupees), Occupation, Number of siblings, Parental involvement in education, Access to internet at home, Type of device use to access the internet, Pervious knowledge regarding artificial intelligence, Interest in learning artificial intelligence

PART-2: Consist of section A and B
Section-A: (Self-structured knowledge questionnaire): It consists of self- structured knowledge questionnaire which seeks facts and information regarding artificial intelligence. It consists of 30 items of multiple-choice questions where total score is 30.

Section-B: (Planned teaching programme): The researcher provided a planned teaching programme to the students regarding artificial intelligence. In which all aspects such as introduction of artificial intelligence, its importance, advantages and disadvantages was covered by researcher in his teaching programme.

Scoring pattern: The self- structured knowledge questionnaire consisted of 30 questions. In which right answer was documented as correct one mark and wring were documented were as zero marks. The complete ranged from 0 to 30.

Knowledge Score	Range	Percentage
Inadequate	0-10	< 33
Moderate	11-20	34-66
Adequate	21- 30	≥70

Content validity tool: The prepared data collection tool, along with the problem statement, objectives and operational definition, was submitted for consent validation to a panel of 10 experts comprises of 1 doctor and 9 nursing professionals. Their suggestion was carefully reviewed and incorporated into the tool after discussion with the research guide and co- guide.

Language validity: The English version of the tool was validated by a subject expert in English language to ensure clarity and grammatically accuracy. The Hindi translated version of the tool was validated by a Hindi language expert

to ensure linguistic accuracy and contextual relevance.

Ethical consideration

- A written permission was obtained from principal, Netaji Subhash College of Nursing, Palampur.
- Ethical clearance was taken from ethical clearance committee of Netaji Subhash College of Nursing.
- Ethical clearance was taken from each study sample anonymity and confidentiality of each sample will be assured and maintained throughout the study.

Reliability of tool: Reliability of tool was computed by applying Karl Pearsons Correlation coefficient formula. The reliability of self- structured knowledge questionnaires was 0.75 so the tool was reliable. The tool was found to be reliable and feasible for conducting the study as range of reliability is from 0.6 to 1.0 according to Suresh K Sharma.

Pilot study: After obtaining the administrative approval, pre testing of structured questionnaire was done by administering it to 6 adolescents at St. Paul school, Palampur on month of April. The subject chosen were similar in the characteristics to those of the population under study to check the items for clarity, relevance of items and nature of response. It was found that participants took 30 minutes to complete the structure questionnaire. The items of structured questionnaire were clear and unambiguous.

Procedure of data collection: Burns and Grove states that data collection is the identification of subjects and precise, systematic gathering of information (data) relevant to research-to-research purpose or the specific objective, questions, or hypothesis of the study. After obtaining formal administrative approval from the principal and schools of selected areas i.e. Palampur. The aim of the study was to evaluate the effectiveness of planned teaching programme on knowledge regarding artificial intelligence among adolescents in selected schools of District Kangra, Himachal Pradesh. After obtaining permission from concerned authorities, the investigators develop rapport and take consent from adolescents. Total 60 sample were selected by non- probability convenient sampling technique. After getting consent from the sample who met the inclusion criteria

1. **Pre-test:** On 1st day pre-test was administered to the adolescents in the form of self- structured knowledge questionnaires.
2. Provide planned teaching programme to the study sample
3. **Post test:** Post- test was conducted on the 7th day of pre-test with same set of self- structured knowledge questionnaire.

The data were compiled and analysis was done by using descriptive and inferential statistics.

Data analysis

The analysis was made based on the objectives and hypothesis. Both descriptive and inferential statistics were used for the data analysis such as:

- **Descriptive statistics:** the statistical analysis include frequency, percentage, mean, median and standard deviation.
- **Inferential statistics**
  - Paired t- test will be used to find out the significant difference between pre-test and post-test.
  - Chi square test will be used to find out the association of post-test knowledge scores of adolescents with their selected socio demographic variables.

Analysis and interpretation of data: Data was entered in master sheet, for tabulation and statistical processing in order to analyze and interpret using descriptive and inferential statistics methods. The result of analysis of data have been organized and presented under following sections:

Section-I

Description of selected socio - demographic variables of adolescent students

This table shows the finding related to Frequency and percentage distribution of adolescent students regarding use and importance of E-Learning.

Table 1: Frequency and Percentage Distribution of Adolescent Students Based on Socio-Demographic Variables and E-Learning Usage

Sr. No.	Selected Socio-Demographic Vraiables	Options	(f)	(%)
1.	Age (in years)	10-12 years	18	30.0%
		13-14 years	14	23.3%
		15-16 years	19	31.7%
		17-18 years	9	15.0%
2.	Gender	Male	30	50.0%
		Female	30	50.0%
3.	Class	5-6	12	20.0%
		7-8	12	20.0%
		9-10	18	30.0%
		11-12	18	30.0%
4.	Type of school	Government School	20	33.3%
		Private School	40	66.7%
5.	Area of Residence	Urban area	10	16.7%
		Rural area	50	83.3%
6.	Family members	Single Parent family	0	0.0%
		Nuclear family	36	60.0%
		Extended family	7	11.7%
		Joint family	17	28.3%

7.	Monthly family income (in rupees)	Less than 20,000	4	6.7%
		20,001-30,000	3	5.0%
		30,001-40,000	18	30.0%
		40,001-50,000	35	58.3%
8.	Education of Father	No formal education	0	0.0%
		Primary education	4	11.7%
		Secondary education	11	18.3%
		Higher education	45	75.0%
9.	Education of Mother	No formal education	0	0.0%
		Primary education	7	11.7%
		Secondary education	20	33.3%
		Higher education	33	55.0%
10.	Occupation of Father	Farmer	4	6.7%
		Government service	12	20.0%
		Private job	36	60.0%
		Business	8	13.3%
11.	Occupation of Mother	Farmer	1	1.7%
		Government service	1	1.7%
		Private job	12	20.0%
		Homemaker	46	76.7%
12.	Frequency of E-learning usage	Daily	13	21.7%
		Once a week	5	8.3%
		Several times a week	6	10.0%
		Rarely or never	36	60.0%
13.	Access to E-learning devices	No	36	60.0%
		Yes	24	40.0%
13.(a)	If yes, then specify the device used: Smartphone	No	36	60.0%
		Yes	24	40.0%
	Laptop	No	60	100.0%
		Yes	0	0.0%
	Computer	No	60	100.0%
		Yes	0	0.0%
	Tablet	No	60	100.0%
		Yes	0	0.0%
14.	Internet connection used for e-learning	No	36	60.0%
		Yes	24	40.0%
14.(a)	If yes, then specify the type used: Wi-Fi	No	54	90.0%
		Yes	6	10.0%
	Mobile data	No	42	70.0%
		Yes	18	30.0%
	Broadband	No	60	100.0%
		Yes	0	0.0%
	Hotspot	No	60	100.0%
		Yes	0	0.0%
15.	Parental involvement in E-Learning activities	Regular monitoring and support	8	13.3%
		Occasional monitoring and support	7	11.7%
		Minimal Involvement	7	11.7%
		No involvement	38	63.3%
16.	Do you have prior knowledge of E-Learning	No	36	60.0%
		Yes	24	40.0%
16.(a)	If yes, then specify source: School	No	48	80.0%
		Yes	12	20.0%
	Internet	No	58	96.7%
		Yes	2	3.3%
	Social media	No	50	83.3%
		Yes	10	16.7%
	Friends or family members	No	60	100.0%
		Yes	0	0.0%
17.	Do you have prior experience with E- learning	No	36	60.0%
		Yes	24	40.0%
17.(a)	If yes, then specify source: Online classes	No	57	95.0%
		Yes	3	5.0%
	Mobile learning apps	No	43	71.7%
		Yes	17	28.3%
	Social media	No	56	93.3%
		Yes	4	6.7%
	Family guidance or support	No	60	100.0%
		Yes	0	0.0%

Section-II

Assess the pre-test knowledge score of adolescent students regarding use and importance of E-Learning

This section shows the findings related to frequency and percentage distribution of pre-test knowledge scores regarding use and importance of E-Learning among adolescent students. The majority of adolescent students i.e., 51.7% have inadequate knowledge, 48.3% of adolescent students have moderate knowledge and 0% of adolescent students have adequate knowledge during their pre-test.

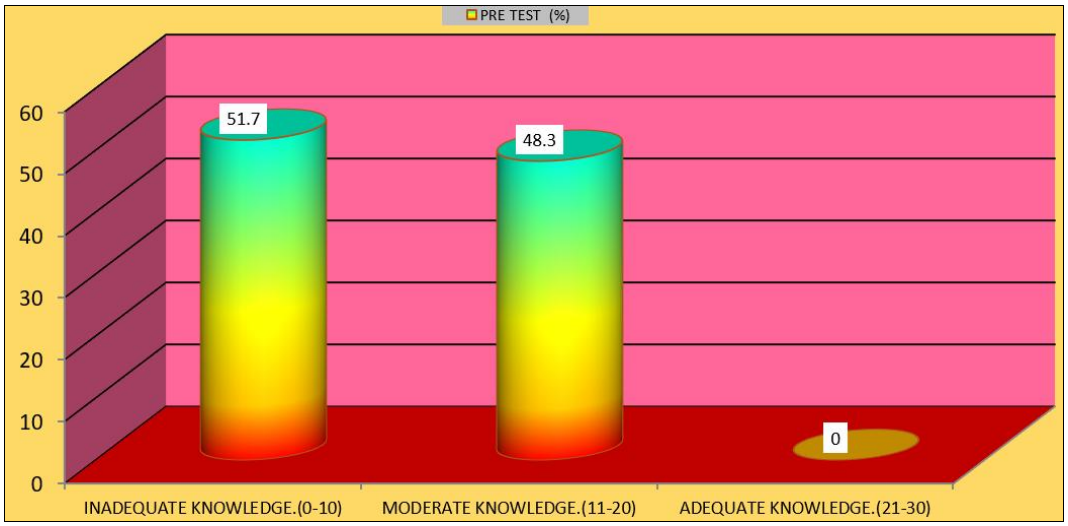

Fig 1: Criterion Measures (PRE)

Section-III

Assess the post-test knowledge score of adolescent students regarding use and importance of E-Learning

This section shows the findings related to frequency and percentage distribution of post-test knowledge scores regarding use and importance of E-Learning among adolescent students. The majority of adolescent students i.e., 56.7% have moderate knowledge, 43.3% of adolescent students have adequate knowledge through self structured knowledge questionnaire regarding use and importance of E-Learning among adolescent students.

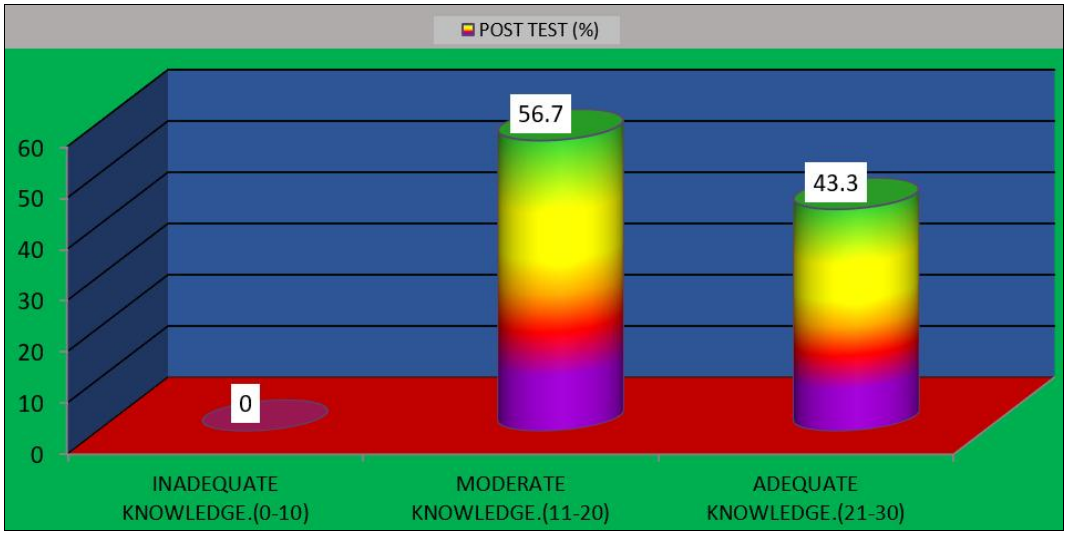

Fig 2: Criterion Measures (POST)

Section-IV

Comparison between pre-test and post-test knowledge score of adolescent students regarding use and importance of E-Learning

This section shows the findings related to comparison between frequency and percentage of pre-test and post-test knowledge scores regarding use and importance of E-Learning among adolescent students. This data depicts that in pre-test, adolescent students with inadequate knowledge have frequency score 31 and percentage of 51.7%,whereas,in post-test the frequency was 0 and percentage was also 0%.Among moderate knowledge adolescent students, the frequency was 29 and percentage was 48.3% in pre-test, where as in post-test frequency was 34 and percentage was 56.7%.Among adeqaute knowledge adolescent students, the frequency was 0 and percentage was also 0% in pre -test, where as in post-test frequency was 26 and percentage was 43.3%.

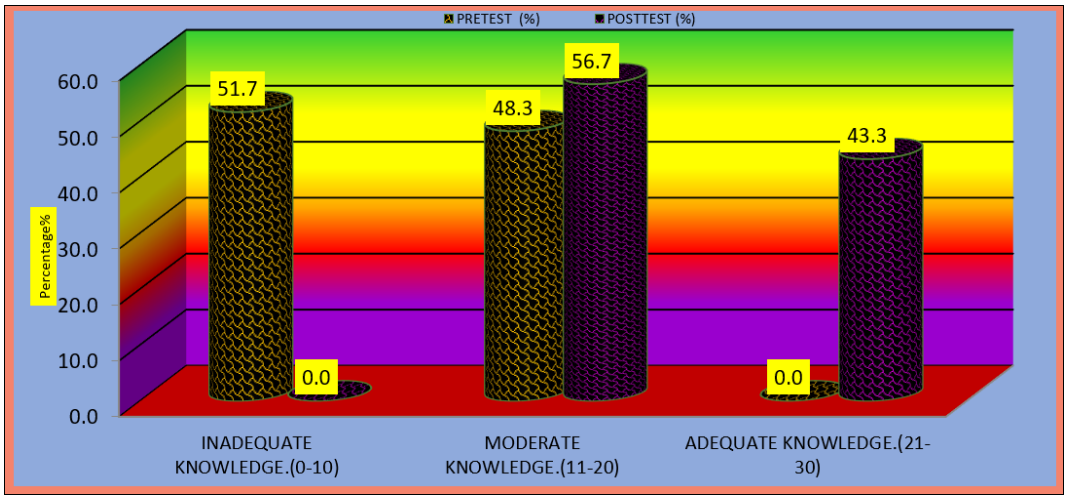

Fig 3: Criterion Measures

Section -V

Association between post -test knowledge scores with their selected demographic variables regarding use and importance of E-Learning among adolescent students

Table 2: Association Between Post-Test Knowledge Scores and Selected Socio-Demographic Variables Regarding E-Learning

Selected Socio-Demographic Variables	Adequate	Moderate	Inadequate	df	χ^2	P value
Age (in years)						
10-12	0	18	0	3	28.096*	0.000
13-14	5	9	0			
15-16	12	7	0			
17-18	9	0	0			
Gender						
Male	13	17	0	1	0.000N.S.	1.000
Female	13	17	0			
Class						
5-6	0	12	0	3	34.321*	0.000
7-8	1	11	0			
9-10	8	10	0			
11-12	17	1	0			
Type of school						
Government School	9	11	0	1	0.034N.S.	0.854
Private School	17	23	0			
Area of Residence						
Urban	6	4	0	1	1.357N.S.	0.244
Rural	20	30	0			
Family Members						
Single Parent family	0	0	0	2	1.031N.S.	0.522
Nuclear family	15	21	0			
Extended family	2	5	0			
Joint family	9	8	0			
Monthly family income (in rupees)						
Less than 20,000	1	3	0	3	0.760N.S.	0.859
20,001-30,000	1	2	0			
30,001-40,000	8	10	0			
40,001-50,000	16	18	19			
Education of father						
No formal education	0	0	0	2	0.969N.S.	0.616
Primary education	1	3	0			
Secondary education	4	7	0			
Higher education	21	24	0			
Education of mother						
No formal education	0	0	0	3	3.759N.S.	0.153
Primary education	1	3	0			
Secondary education	4	7	0			
Higher education	21	24	0			

Occupation of father						
Farmer	1	3	0	3	2.251$^{N.S.}$	0.522
Government service	4	8	0			
Private job	16	20	0			
Business	5	3	0			
Occupation of Mother						
Farmer	0	1	0	3	2.706$^{N.S.}$	0.439
Government service	0	1	0			
Private job7	7	5	0			
Homemaker	19	27	0			
Frequency of E-Learning usage						
Daily	13	0	0	3	45.543*	0.000
Once a week	4	1	0			
Several times a week	6	0	0			
Rarely or never	3	33	0			
Access to E-Learning devices						
No	3	33	0	1	44.898*	0.000
Yes	23	1	0			
If yes, then specify type of device used Smartphone						
No	3	33	0	1	44.898*	0.000
Yes	23	1	0			
Laptop						
No	26	34	0		N.A.	N.A.
Yes	0	0	0			
Computer						
No	26	34	0		N.A.	N.A.
Yes	0	0	0			
Tablet						
No	26	34	0		N.A.	N.A.
Yes	0	0	0			
Internet connection used for e-learning						
No	3	33	0	1	44.898*	0.000
Yes	23	1	0			
If yes, then specify the type used						
Wi-Fi						
No	20	34	0	1	8.718*	0.000
Yes	6	0	0			
Mobile Data						
No	9	33	0	1	27.356*	0.000
Yes	17	1	0			
Broadband						
No	26	34	0		N.A.	N.A.
Yes	0	0	0			
Hotspot						
No	26	34	0		N.A.	N.A.
Yes	0	0	0			
Parental involvement in E-Learning activities						
Regular monitoring and support	8	0	0	3	38.827*	0.000
Occasional monitoring and support	7	0	0			
Minimal involvement	6	1	0			
No involvement	5	33	0			
Do you have prior knowledge of E-Learning						
No	3	33	0	1	44.898*	0.000
Yes	23	1	0			
If yes, then specify source School						
No	15	33	0	1	14.270*	0.000
Yes	11	1	0			
Internet						
No	24	34	0	1	2.706$^{N.S.}$	0.100
Yes	2	0	0			
Social Media						
No	16	34	0	1	15.692*	0.000
Yes	10	0	0			
Friends or family members						
No	26	34	0		N.A.	N.A.
Yes	0	0	0			

Do you have experience with E-Learning						
No	3	33	0	1	44.898*	0.000
Yes	23	1	0			
If yes, then specify source Online Classes						
No	24	33	0	1	0.700N.S.	0.403
Yes	2	1	0			
Mobile Learning apps						
No	9	34	0	1	31.020*	0.000
Yes	17	0	0			
Social Media						
No	22	34	0	1	5.604*	0.018
Yes	4	0	0			
Family guidance or support						
No	26	34	0		N.A.	N.A.
Yes	0	0	0			

*= Significant NS= Not significant

Data given in table shows the computed Chi-square of selected socio-demographic variables and the level of knowledge of adolescent students. The data revealed that there was no significant association of level of knowledge with selected socio -demographic variables i.e. gender, type of school, area of residence, family members, monthly family income (in rupees)education of father, education of mother, occupation of father, occupation of mother, access to E-Learning devices if yes then type of device used like laptop, computer and tablet, type of internet connection used at for E-Learning, if yes then type of internet connection used such as broadband, hotspot, do you have prior knowledge with E-Learning, if yes then source such as internet, friends or family, do you have prior experience with E-Learning, if yes then source such as online classes, family guidance or support. There was significant association of level of knowledge with selected demographic variables age, class, frequency of E-Learning usage, access to E-Learning devices, if yes then source through smartphone, internet connection used for E-Learning, if yes then type of connection used such as Wi-Fi, mobile data, parental involvement in E-Learning activities, do you have prior knowledge of E-Learning, if yes then source through school and social media and do you have prior experience with E-Learning, if yes then source through mobie learning apps and social media.

Conclusion

Adolescent students, being in their formative academic years, are increasingly exposed to digital modes of education such as E-learning. However, many of them lack adequate knowledge regarding the proper use and significance of E-learning platforms. This limited awareness can hinder their ability to benefit fully from online learning resources. Therefore, educating students through well-designed interventions can be an effective strategy to enhance their understanding and promote better utilization of e-learning tools in their academic journey. The findings of the present study revealed that a structured teaching programme significantly improved the knowledge of adolescent students regarding the use and importance of e-learning. Hence it was concluded that the use of structured teaching programme is an effective strategy for improving the knowledge regarding use and importance of E-Learning among adolescent students.

Limitation

The study was limited to:

- The sample size was only 60 adolescent students.
- The data collection period was limited to one month.
- The study was conducted only in selected schools among adolescent students aged 10-17 years.
- The tool used for data collection was a closed-ended structured questionnaire.

Recommendations

Keeping in view of the present research study findings, the following recommendations have been made:

- A similar study can be replicated on a large-scale basis involving more schools and a larger adolescent sample.
- A true experimental study can be conducted to assess the effectiveness of structured teaching programme on e-learning knowledge among adolescents.
- A longitudinal study can be conducted to assess the long-term retention of knowledge regarding the use and importance of e-learning among adolescent students.
- A comparative study can be conducted to compare the effectiveness of structured teaching programme with other digital learning methods.
- A study can be conducted to assess the knowledge, attitude, and practices of teachers and parents regarding e-learning among adolescents.
- A study can be undertaken to evaluate the effectiveness of blended learning approaches in enhancing e-learning among adolescent students.
- A comparative study can be conducted between urban and rural adolescent students regarding their knowledge and use of e-learning.

Conflict of Interest

Not available.

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