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Developing Digital Literacy Programs in Academic Libraries

Sangita Arun Mandlik[1], Parmanand Prabhat[2], Vaibhav Anil Nehete[3], Nayan Dhananjay Kadam[4], Shamim Alam[5], Durgesh Talele[6]

[1]Assistant Professor, MBA Department, Sandip University Nashik, Nashik, Maharashtra, India. sangita.mandlik@sandipuniversity.edu.in
[2]Assistant Professor, Deaprtment of Computer Engineering, Sandip University Sijoul, Madhubani, Bihar, India. parmanand.prabhat@sandipuniversity.edu.in
[3]Assistant Professor, Department of Artificial Intelligence and Data Science, Sandip Institute of Technology & Reserch Centre, Nashik, Maharashtra, India. vaibhav.nehete@sitrc.org
[4]Assistant Professor, Department of Information Technology, Sandip Institute of Technology & Reserch Centre, Nashik, Maharashtra, India. nayan.kadam@sitrc.org
[5]Assistant Professor, MBA Department, Sandip University Sijoul, Madhubani, Bihar, India. shamim.alam@sandipuniversity.edu.in
[6]Assistant Professor, MBA Department, Sandip University Nashik, Nashik, Maharashtra, India. durgesh.talele@sandipuniversity.edu.in

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Abstract: More and more digital tools are being used in schools, which has made it even more important for academic libraries to have strong digital literacy programs. These classes are exceptionally critical for giving understudies and instructors the aptitudes they ought to discover, analyse, and utilize advanced devices well. This exposition looks at how advanced education programs were made and put into activity in college libraries, centring on best hones, issues, and conceivable future ways. Computerized proficiency incorporates a part of diverse aptitudes, such as knowing how to utilize data and communication advances accurately and utilizing advanced devices in a fair way. Since they are the centres of learning and data, scholastic libraries are in an extraordinary position to lead endeavours that make strides these aptitudes. The paper looks at distinctive computerized proficiency models and systems, just like the ACRL Framework for Data Education for Higher Instruction, and how they can be utilized to form library programs. Case considers from a variety of scholastic schools appear how to form advanced proficiency programs that work. These incorporate working with instructors to form advanced education a portion of the educational programs, classes and lessons on digital tools and stages, and computerized education rooms and one-on-one gatherings for more individualized offer assistance. It has moreover been pointed out that utilizing online courses and locks in devices could be a great way to reach more individuals and suit diverse ways of learning. There are numerous issues that come up when trying to run computerized learning programs. Issues like not sufficient cash, ineffectively prepared staff, and instructor and understudy pushback to alter are talked almost. The paper also talks about the digital gap and stresses how important it is for schools to be open to all students, no matter what their socioeconomic background is. In the future, college libraries that offer digital literacy classes may use

new technologies like artificial intelligence and virtual reality to make learning more fun. It is also looked at how digital literacy programs could reach more people and have a bigger effect if they worked together with other offices and outside groups.

Keywords: Digital Literacy, Academic Libraries, Information Literacy, Digital Tools, Curriculum Integration.

I. INTRODUCTION

The fast development of technology in the digital age has completely changed the way education works, affecting how information is viewed, handled, and shared. Because of this, literacy has grown beyond reading and writing to include digital literacy, which is an important skill that lets people find and use digital tools correctly. Scholastic libraries utilized to fair be places where books and papers were kept, but presently they've changed into places where advanced learning and consider can happen. Solid computerized proficiency programs have to be made in college libraries to give understudies, instructors, and staff the aptitudes they got to do well in an innovation driven world since of this alter. Advanced proficiency incorporates numerous abilities, such as being able to discover, analyse, and utilize information from numerous distinctive advanced sources in a valuable way. It too implies knowing how to utilize computerized apparatuses for teamwork and conversation, keeping track of computerized characters, and being capable within the computerized world. These aptitudes are getting to be increasingly critical in schools, where web devices are utilized a part for learning, educating, and think about. As the most places where data is shared and offer assistance is advertised, scholarly libraries are impeccably put to lead the way in advancing advanced proficiency. A few issues come up once you attempt to educate computerized proficiency in college libraries. Issues incorporate a need of reserves, hesitance to alter, and distinctive levels of computerized expertise among kids and instructors. Indeed with these issues, numerous college libraries have put in put advanced proficiency programs that other libraries can utilize as illustrations [1]. Workshops, online lessons, and one-on-one offer assistance are common parts of these programs, which are made to meet desires of all sorts of understudies.

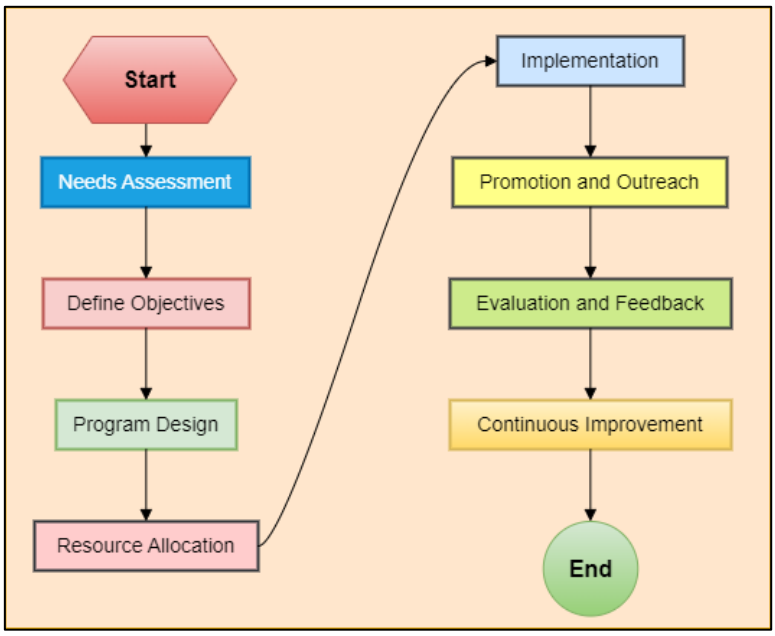

Figure 1: Illustrating the development of digital literacy programs in academic libraries

It has been particularly supportive to work with instructors to join computerized education into the educational modules. This way, understudies do not fair learn advanced proficiency abilities on their possess, but as portion of their in general instruction. Understanding the diverse speculations and models that lead these ventures is one of the foremost critical parts of making computerized education programs. One well-known illustration is the ACRL System for Data Proficiency for Higher Instruction, which is put out by the Affiliation of College and Inquire about Libraries. This system appears a bunch of primary thoughts and rules that can be utilized as a base for making total programs for computerized learning. Scholarly libraries can make beyond any doubt that their computerized proficiency programs are based on best practices and can meet the wants of their clients by making beyond any doubt that their programs are in line with set up benchmarks [2]. Case considers from a extend of scholastic schools can instruct us a parcel almost the methodologies and strategies that make computerized education programs work. A few libraries, for illustration, have set up "advanced proficiency labs" where understudies can learn how to utilize computerized apparatuses and materials by doing. In these labs, students can get help tailored to their specific needs through one-on-one discussions. Classes and lectures on topics like how to handle data, how to use online tools for collaboration, and how to conduct digital research are also included in effective digital literacy programs. Not only do these programs assist students in improving their technology use, but they also teach them more about the moral and crucial aspects of using digital resources. The use of engaging tools and online courses is one of the most important ways to promote digital literacy. With these tools, you can learn at your own pace and in a way that fits your learning style and plan. Online lessons can make learning digital literacy enjoyable and accessible by employing, among other methods, live scenarios, tests, and movies. Additionally, because these tools are available online, anyone in the academic community, even those who are unable to attend in person meetings, can use them [3].Even though many digital literacy programs have been successful, there are still problems. Funding is always a problem, and many university libraries have trouble getting the money they need to support full digital literacy programs. Professional development for staff is also very important; teachers and other staff members need to know how to teach digital literacy successfully.

II. RELATED WORK

There has been a lot of interest in the expansion of university library digital literacy programs over the past few years. This has prompted a ton of study and valuable undertakings. One of the main plans on which these efforts are based is the Association of College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education. The importance of information literacy as a component of digital literacy as a whole is emphasized in this theory. It additionally makes sense of fundamental thoughts like power, concentrate as question, and data creation. These ideas provide us with a solid foundation for developing and implementing college-specific digital literacy programs. The ACRL system's application to university libraries has been the subject of numerous studies. For instance, Julien investigated the ways in which libraries and teachers collaborate to teach students information literacy [4]. This way, understudies can learn these critical abilities whereas doing their schoolwork. This joint strategy not as it were makes a difference understudies learn how to utilize innovation way better, but it moreover builds more grounded connections between libraries and teachers, which is vital for keeping these programs going. Advanced education is instructed in schools, and college libraries

have too made a number of apparatuses and materials that can be utilized on their claim.

These are places where understudies can learn how to utilize computerized apparatuses and stages by utilizing them themselves. These labs deliver understudies an open and locks in space to make strides their computerized abilities. Curators offer individualized offer assistance through one-on-one gatherings and classes for bunches. The success of these kinds of programs shows how important it is for libraries to have places and materials set aside to help people learn how to use technology.

Online learning programs are another popular way to teach people how to use technology. It looked at how online lessons affected students' digital literacy skills and found that these tools are very good at giving students the chance to learn at their own pace and in a way that is convenient for them [5]. Online lessons can keep students interested and work with a variety of learning styles by including video and interactive parts. Online tools are also a good way to reach a lot of people in the academic community because they can be used by many people at once.

Table 1: Summary of Related Work

Object	Key Finding	Limitation	Impact
Information Literacy Instruction	Students showed improved research skills and critical thinking	Limited to library instruction sessions	Enhanced student academic performance and engagement
Embedded Librarianship	Increased collaboration between librarians and faculty, leading to more integrated learning	Requires significant time and resource investment	Strengthened curriculum and support for digital literacy
Online Tutorials and Resources	Provided flexible, on-demand learning opportunities for students	Varied engagement levels and completion rates	Broader reach and accessibility for diverse student populations
Workshops and Training Sessions [6]	Direct, hands-on experience improved student confidence in digital tools	Attendance and participation rates were inconsistent	Immediate skill application and increased student participation
Partnerships with Academic Departments	Facilitated the integration of digital literacy into various disciplines	Coordination challenges between departments and libraries	Comprehensive digital literacy development across the curriculum
Assessment of Digital Literacy Skills	Identified gaps in students' digital competencies	Assessment tools and methods still evolving	Targeted improvement strategies and better support for student needs
Library-Supported Research Projects	Enhanced student understanding of research processes	Limited to students participating in specific projects	Promoted deeper learning and practical application of digital skills
Digital Literacy in First-Year Programs	First-year students gained foundational digital skills early in their academic careers	Variable integration across different programs	Better prepared students for subsequent coursework and research
Faculty Development Programs [7]	Faculty became better equipped to teach and support digital literacy	Requires continuous effort and time from faculty	Enhanced teaching quality and student support in digital literacy
Community	Built stronger relationships	Potentially limited	Increased community

Outreach and Collaboration	between libraries and the broader academic community	by library resources and staff availability	engagement and awareness of digital literacy resources
Use of Emerging Technologies	Introduction of VR, AR, and AI tools provided innovative learning experiences	High cost and need for specialized training	Enhanced student engagement and exposure to cutting-edge technologies
Evaluation of Program Effectiveness	Ongoing evaluation helped refine and improve digital literacy programs	Data collection and analysis can be resource-intensive	Continuous improvement of program offerings and better student outcomes

III. DIFFERENT FRMEWORK

A. Definition and conceptual framework of digital literacy

There are numerous viewpoints to computerized education that go past fair knowing how to utilize advanced instruments. It incorporates all the information, aptitudes, and capacities you would like to discover your way around, assess, and make data in a computerized setting. Computerized education is more than fair knowing how to utilize innovation well. It too incorporates being able to think fundamentally, get it morals, and interface and work together in advanced places [8]. This all-around see of computerized proficiency recognizes how imperative it is for giving individuals the tools they got to completely lock in within the computerized age. A solid mental system for computerized proficiency incorporates a number of vital parts. To begin with, data proficiency is exceptionally vital. This implies having the abilities to discover, analyze, and utilize data accurately. This incorporates knowing how to utilize data in a great way and knowing how dependable and important the sources are. Moment, you wish to know how to utilize innovation to communicate and work together. These incorporate being able to utilize advanced instruments to talk effectively, work with others, and be a portion of online bunches. In this circumstance, it's exceptionally vital to get it computerized conduct and how computerized trades work.

Third, knowing how to utilize media is a significant piece of knowing how to utilize innovation. To do this, you should have the option to contemplate advanced media, realize how it's made, and comprehend what media explanations mean for individuals. This part is getting more and more important in a time when there is a lot of information online and fake news. Fourth, creating digital content necessitates knowing how to effectively produce and distribute digital content. Grasping computerized stories, video creation, and the different advanced channels used to share material are all essential for this. Digital literacy classes are developed using a fundamental plan known as the ACRL Framework for Information Literacy for Higher Education [9]. As a planned method for teaching digital literacy, it presents talk-based explanations of fundamental concepts like authority, knowledge creation, and research. By ensuring that computerized proficiency programs are in accordance with these sorts of models, educators and libraries can ensure that their courses cover everything, fit together well, and can adjust to the changing requirements of the scholarly local area.

B. Evolution of digital literacy in academic libraries

The changes in digital skills in university libraries are a reflection of larger changes in technology and the way we learn. At first, college libraries mostly taught standard information literacy, which meant teaching people how to find and use paper materials. But as digital tools spread to all parts of study and education, libraries changed to meet the

growing need for people who knew how to use computers [10. This change is happening because people know that being able to use digital tools and materials well is important for doing well in school and learning throughout life. In the beginning, university libraries' digital literacy programs were mostly reactive, meeting pressing needs like teaching basic computer skills and how to use online resources. Faculty and students learned how to use library directories, internet journals, and other digital tools in workshops and training classes. By getting people used to basic digital tools and ideas, these efforts paved the way for more comprehensive digital literacy programs. As digital tools got better, university libraries started to take a more active role in teaching people how to use computers. Because of this, digital literacy had to be added to the program by working with the teachers. Libraries created specific programs and materials that went with certain classes and subjects.

This made sure that digital literacy skills were part of a larger educational environment. This alter from partitioned classes to assist built into the educational modules was a big step forward within the history of advanced proficiency programs. Advanced education classes have changed indeed more since the ACRL System for Data Education for Higher Instruction came out. This framework gave an organized way to form total computerized education lessons that stressed critical thought, utilizing data in an moral way, and how ponder is worn out cycles. Libraries begun to create programs that instructed more than fair essential aptitudes [11]. These programs moreover instructed almost the imperative and ethical perspectives of digital literacy. Recently, new innovations like manufactured insights, virtual reality, and information analytics have been brought into the picture. Presently, scholarly libraries are searching for better approaches to utilize these apparatuses in their advanced education programs. This will give students cutting-edge skills that are becoming more useful in a digital world that is changing quickly.

C. Existing digital literacy programs in academic libraries

Advanced learning programs in college libraries are presently an critical portion of making a difference understudies and instructors with their consider and schoolwork. The run of these programs and how they are conveyed are exceptionally diverse, which appears how distinctive schools have diverse needs and implies. An vital portion of numerous programs is that they educate computerized proficiency in a total way, counting specialized abilities, basic thought, and ethical issues. Including lessons on advanced education to the school program through connections with instructors is one common strategy. This way of doing things makes beyond any doubt that advanced proficiency abilities are valuable in certain areas and classes. For occasion, libraries and instructors may work together to form errands that require understudies to utilize advanced devices for things like think about, information examination, or making substance. This makes a difference kids see how computerized education abilities will offer assistance them in school and in their future employments. Another common portion of advanced education classes is workshops and addresses [12]. Fundamental computer abilities and using digital databases are fair some of the things that are talked around in these gatherings. More progressed themes incorporate information visualization, computerized stories, and taking care of advanced personalities. Workshops are frequently made to be locks in, so individuals can utilize computerized stages and devices in genuine life.

They can be given in individual, online, or a blend of the two to fit the wants and plans of understudies who learn in several ways. For understudies to utilize advanced instruments and get one-on-one offer assistance, advanced education labs are set aside places fair for

them. One-on-one talks with instructors, who deliver offer assistance based on each person's needs, are common in these rooms. These labs have specialized program and hardware that produces learning more fun and lets understudies attempt out more progressed digital apps. Increasingly individuals are learning how to utilize innovation by utilizing online lessons and classes. Understudies can learn at their claim pace and go over data once more in the event that they have to be with these instruments. Numerous online classes have interactive media highlights like motion pictures, tests, and intuitively errands that make learning fun and simple to get to. A few libraries have too included modern instruments to their computerized education programs, like virtual reality (VR) and increased reality (AR).

D. Challenges and opportunities in developing digital literacy programs

Digital tools and resources also need ongoing upkeep and changes, which requires ongoing cash support [13]. Making sure that staff have the right training to teach digital literacy is another big problem. Librarians need to keep up with how digital tools and teaching methods are changing quickly, which means they need to keep learning new skills. A block can also be staff and school members who don't want to change. They might not want to use new tools or training methods.

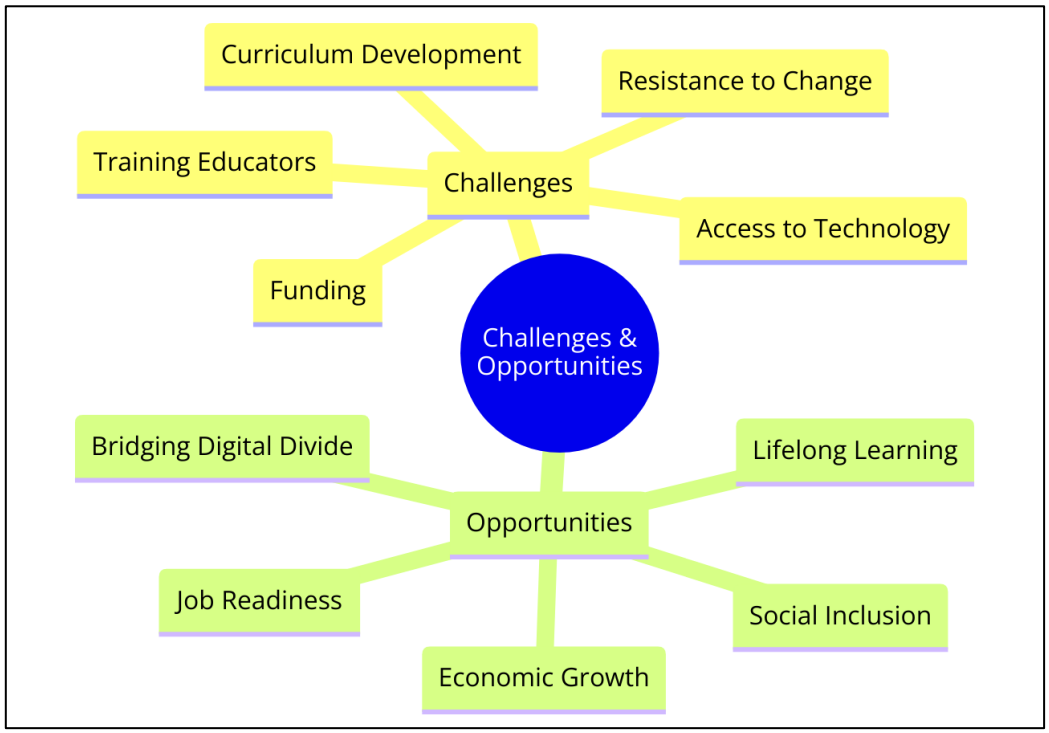

Figure 2: Illustrating the challenges and opportunities in developing digital literacy programs

Even with these problems, there are a lot of good reasons to create digital literacy classes. One big chance is that digital tools and resources could be used to get students and teachers more involved. Digital literacy programs that are well-made can teach people how to use technology to do study, learn, and communicate, which can greatly improve their school and work skills, illustrate in figure 2. By helping people learn how to use technology, academic libraries can help students do better in school and get ready for work in the digital world. Another chance is the rise of online and mixed learning settings [14]. Digital literacy programs can be changed to fit the needs of students who are learning from home, teaching them how to use online tools and platforms correctly. Because of their

adaptability, online classes and courses enable libraries to expand their audience and accommodate a diverse range of learning strategies and plans. Innovative new methods for teaching digital skills are made possible by emerging technologies like artificial intelligence (AI), virtual reality (VR), and augmented reality (AR). Learning can become more involved and dynamic thanks to these technologies, which can make complex digital concepts simpler to comprehend and more interesting. AI can design individualized learning paths based on your needs and progress, and VR can create realistic situations where you can practice your digital skills.

IV. METHODOLOGY

A. Research Design

1. Qualitative research approach

The goal of qualitative study is to understand the depth and complexity of social events and human encounters. Quantitative research is mostly about numbers and statistical analysis. Qualitative research, on the other hand, is about exploring meanings, motives, and relationships through rich, thorough accounts. This method works especially well for studies that want to learn more about views, behaviors, and relationships that are hard to measure. Interviews are one of the main tools used in qualitative research because they let researchers get detailed information from the people who are being studied. Depending on the goals of the study, interviews can be planned, partially planned, or not planned at all [15]. A lot of interviews are semi-structured, which means they have set questions but also allow for free-flowing conversation about any topic that comes up. This method strikes a good mix between getting reliable data and letting people easily share their thoughts and experiences. Another important method in qualitative research is participant observation, in which researchers live in a community or setting and spend time with people there to watch and talk to them in their normal setting. The goal of qualitative study is to understand the depth and complexity of social events and human encounters. Quantitative research is mostly about numbers and statistical analysis. Qualitative research, on the other hand, is about exploring meanings, motives, and relationships through rich, thorough accounts. This method works especially well for studies that want to learn more about views, behaviours, and relationships that are hard to measure. Interviews are one of the main tools used in qualitative research because they let researchers get detailed information from the people who are being studied. Depending on the goals of the study, interviews can be planned, partially planned, or not planned at all [15]. A lot of interviews are semi-structured, which means they have set questions but also allow for free-flowing conversation about any topic that comes up. This method strikes a good mix between getting reliable data and letting people easily share their thoughts and experiences. Another important method in qualitative research is participant observation, in which researchers live in a community or setting and spend time with people there to watch and talk to them in their normal setting. This way of looking at things can help you understand the social processes and cultural practices that affect behavior better by giving you more background information.

Participant observation is a main method used a lot in ethnography, which is the thorough and organized study of people and countries. A lot of the time, focus groups are also used in qualitative study. These are talks led by a moderator with a small group of people who have similar experiences or traits. Focus groups make it easier for people to share their thoughts and ideas, which helps show shared beliefs and social norms. This is a great way to find out how people connect with each other in a group and to get rich, meaningful data through conversation [16]. Qualitative research is continuous and adaptable, which makes it stand out. Researchers can improve their methods and narrow their focus as the study goes on by collecting and analyzing data

at the same time a lot of the time. A lot of people use thematic analysis, tagging, and story analysis to look at qualitative data. Finding trends, themes, and meanings in the data is what these tools do. This gives a more complete picture of the study questions.

2. Case study methodology

Case study research is a type of qualitative research that looks at one or a few cases in great detail and in the context of other cases. This way works great for looking into complicated problems in the real world, giving us deep, rich information that can help shape both theory and practice. People in areas like business, sociology, psychology, and education often use case studies to help them understand the subtleties and details of a situation. A case study can be about a person, a group, a company, an event, or a situation. The best thing about this method is that it can give you a full and complete picture of the thing you are studying. Researchers get information about the case from many places, like conversations, notes, papers, and items. This helps them build a full and complex picture of the situation [17]. The correctness and dependability of the results are improved by using three different sources of data. Case studies come in different types, such as exploratory, explanatory, descriptive, and intrinsic. Exploratory case studies try to find out more about new topics where there isn't much research yet. They are often the first step toward more in-depth studies. Case studies that try to understand the causes of events in a case are called explanatory case studies. Case studies that describe the case in its environment are called descriptive case studies.

An natural case consider looks at a interesting or curiously case fair since it is curiously, not since it can be utilized to form a articulation. Setting clear limits and portraying the case is one of the foremost imperative parts of doing a case consider. This implies picking a case that fits the inquire about questions and figuring out how enormous the ponder will be. Information collection as a rule takes a part of time and employments a part of diverse strategies to induce a full picture of the case. At that point, based on the sort of consider and its objectives, analysts see at the information utilizing strategies like design coordinating, cross-case blend, and topic investigation. The case ponder strategy has numerous benefits, such as the capacity to consider complicated things in their common setting and to gather large sums of high-quality information [18]. But it moreover has a few issues, just like the chance of consider inclination and inconvenience applying comes about to bigger bunches of individuals. Case thinks about are still exceptionally valuable for getting profound experiences and a full understanding of particular circumstances, which makes them a solid apparatus for subjective investigate.

B. Data Collection

1. Semi-structured interviews with librarians and educators

There is a set of questions that are used in semi-structured interviews, but the interviewer can also go into more detail about things that come up during the talk [19]. "Can you describe your experience with implementing digital literacy programs?" or "What challenges have you encountered in teaching digital literacy skills?" are two examples of questions that a researcher might ask. Because semi-structured interviews are flexible, researchers can dig deeper based on what the subjects say. A researcher can ask more questions to better understand an issue if a library talks about a problem with incorporating digital literacy into the program. This freedom to change is very important for getting deep, rich insights that might not come up in a more rigid questioning setting. It's easier for people to talk about their experiences and points of view in semi-structured interviews because they feel more like conversations. Building a relationship with them can help them give more honest and complete answers, which is good for the

research study. Using semi-structured interviews also lets researchers get to the details and difficulties of the users' experiences, which are very important for understanding how digital literacy programs in university libraries work on many levels. To make sure that the data they get from semi-structured conversations is accurate and reliable, researchers usually record them and then copy them so they can be analysed [20]. A lot of the time, thematic analysis is used to find themes and trends in data that help scholars come to useful conclusions and insights. When doing semi-structured conversations, it's also very important to think about ethical issues like getting full permission and keeping things private.

2. Surveys of students and faculty members

Many types of study, both quantitative and qualitative, use surveys as a flexible way to gather information. When looking into digital literacy classes in college libraries, polling students and teachers can give you useful information about how they feel, what they've experienced, and what they need. Overviews can grant a wide picture of how computerized education programs are acknowledged and what ranges may require development by collecting data from a part of diverse individuals. To form a great survey, you would like to incorporate both closed- and open-ended things. Answers to closed-ended questions, like multiple-choice or Likert scale questions, can be turned into numbers that are simple to look through for designs and patterns. In a survey, individuals could be inquired to rate on an extend from 1 to 5 how certain they are in utilizing advanced instruments. This numeric information can appear instructors and understudies where they feel sure and where they might require more offer assistance. On the other hand, open-ended questions grant you more in-depth data since they let individual's conversation more approximately their contemplations and encounters. People can deliver Nitti gritty input in their claim words by replying questions like "What issues do you run into after you attempt to utilize advanced assets for your coursework?" or "How can the library superior meet your advanced education needs?" This subjective information can provide us more Nitti gritty data almost the troubles and chances that come with advanced information. Different strategies, such as online stages, e-mail, or hand-delivery, can be utilized to execute overviews. Online surveys are a awesome way to reach a parcel of individuals and make it simple for individuals to fill them out. They also make it simple to use digital instruments to accumulate and analyse information.

Table 2: Summary of Surveys of students and faculty members

Method	Future Trends	Benefits	Impact
Online Surveys	Increased use of mobile-friendly survey platforms	High response rates due to ease of access	Improved data collection and representation of diverse populations
Focus Groups	More virtual focus groups to increase participation	In-depth qualitative insights	Enhanced understanding of nuanced perspectives
Mixed-Methods Approaches	Integration of AI tools for data analysis	Comprehensive data from both quantitative and qualitative sources	Holistic understanding of survey results
Longitudinal Studies	Use of advanced statistical methods for tracking changes over time	Identification of long-term trends and impacts	Informed decision-making and policy development

Anonymous Surveys	Greater emphasis on data privacy and security	Higher honesty and openness in responses	More accurate and reliable data
Survey Incentives	Gamification and digital rewards to boost engagement	Increased participation and completion rates	Larger and more diverse sample sizes
Embedded Survey Questions in Course Evaluations	More integration with digital learning management systems	Context-specific feedback and higher response rates	Direct improvement of course content and teaching methods
Real-Time Polling During Classes	Increased use of interactive polling tools like clickers and apps	Immediate feedback on student understanding	Enhanced classroom engagement and adaptive teaching
Follow-Up Interviews	Greater use of automated scheduling tools for follow-up interviews	Detailed, context-rich data	Deepened insights and validation of survey responses
Surveys with Open-Ended Questions	Use of natural language processing to analyze open-ended responses	Rich qualitative data	Enhanced understanding of student and faculty experiences
Social Media Surveys	Growing use of social media platforms for distributing surveys	Reaching a wider and more diverse audience	Increased relevance and inclusivity of survey data
Surveys in Multiple Languages	Expansion of multilingual survey options to reach non-native speakers	Inclusivity and better representation of all demographics	Improved accuracy and comprehensiveness of survey findings

C. Data Analysis

1. Thematic analysis of interview transcripts

A lot of people use thematic analysis to look at qualitative data. It's especially good for making sense of the rich, thorough data that comes from semi-structured conversations. This method includes finding trends (themes) in the data, studying them, and reporting them. This gives us a more complete picture of the subjects' events and points of view. Thematic analysis can be used on interview records with librarians and teachers to learn more about how digital literacy programs are put into place, the problems that come up, and the effects they have on academic libraries. The first step in topic analysis is familiarization. This is when experts read and reread the interview files to get to know the data. This first step helps researchers really understand what the talks were about and how they fit together. It is very important to take notes and underline important words or sentences that seem like they might be related to the research questions at this point. The next step is to make the first codes. Coding is the process of putting data into groups that make sense by finding parts of text that are related to certain ideas or concepts. Codes can be either descriptive, which means they show what the data is directly, or explanatory, which means they show what the data really means and how it is organized. Usually, researchers use software tools or do it by hand to add codes to the texts in a planned way. After all the codes have been entered, the researcher starts to look for trends by putting codes that are similar into bigger groups.

Themes are big patterns that show important parts of the data that are related to the study questions. Some themes that could be used are "challenges in integrating digital literacy," "effective instructional strategies," and "resource constraints." It is very important to go over and improve these themes to make sure they match the data correctly and are different from each other. The next step is to define and name the topics. In this step, researchers have to describe what each theme is about and how it fits into the bigger story of the study. It's important that each theme is clearly outlined and backed up by relevant facts from the recordings. These meanings help make sure that the themes make sense and fit together. Finally, the experts write a thorough report that combines the themes and uses quotes from the interview records to show how they work. This study should give a full and thorough analysis of the data, focusing on the most important results and what they mean for university libraries' digital literacy programs. Researchers can give a rich, thorough account of the users' experiences and points of view by using topic analysis. This gives the field new and useful information.

2. Statistical analysis of survey data

An essential component of quantitative research is statistical analysis of poll data because it provides researchers with an organized method for examining the numbers that respondents provided. Statistical analysis can uncover connections, trends, and patterns in the data when studying digital literacy programs in college libraries. This provides us with useful data regarding the effectiveness of these programs and areas for improvement. Preparing the data, which entails sorting and cleaning the responses to the poll, is the first step. By addressing issues like missing values, duplicate responses, and "outliers," this step ensures that the data is complete and accurate. If you want accurate and dependable results from subsequent studies, it is crucial to prepare the data. Descriptive statistics, which provide an overview of the poll results, are the first step in the analysis process. We can quickly see the main trends and the range of responses using numbers like mean, median, mode, and standard deviation. Descriptive statistics can show things like the typical level of trust between students and teachers when it comes to using digital tools or the most common issues them encounter when learning how to use technology correctly. To entirety up subjective information, just like the number of individuals who have been to advanced education classes, recurrence conveyances and rates can moreover be utilized. Inferential insights do more than fair depict the information; they also draw conclusions almost the entire community from which the sample was taken. To compare bunches and figure out how vital varieties within the information are, methods like t-tests, chi-square tests, and investigation of change (ANOVA) are utilized. For illustration, a t-test may well be utilized to discover out on the off chance that there are huge contrasts in how well college and graduate understudies or staff individuals from diverse areas know how to utilize innovation. Both relationship and relapse considers see at how two or more variables are related to each other. Association coefficients appear how solid and in what way two variables are associated. For illustration, the association between how regularly you utilize library assets and how competent you think you're with innovation. On the other hand, relapse investigation looks at how one or more autonomous variables can be utilized to anticipate a subordinate variable. This might incorporate looking at how age, past encounter, and how regularly somebody employments advanced instruments influence their computerized education levels.

V. FINDINGS

A. Overview of digital literacy programs in selected academic libraries

The increasing importance of digital skills in education and research can be seen in the increasing depth of digital literacy classes offered by academic libraries. Because they are tailored to each school's requirements and

resources, these programs have very different objectives and approaches. A look at a few college libraries reveals that all of them want to assist individuals in learning how to utilize technology in novel and engaging ways. Classes, online lessons, and one-on-one meetings make up the library's robust digital literacy program at the University of California, Berkeley. These assets discuss various subjects, similar to how to deal with information, utilize advanced devices for study, and be fair while utilizing computerized assets. The emphasis of the program is on collaborating with teachers to incorporate digital literacy into lessons. Students acquire these crucial abilities while working on their schoolwork in this manner. Similarly, the library at the College of Michigan has set up a Computerized Grant Lab that is the focal point of advanced learning programs. Augmented reality, 3D models, and information show instruments are only a portion of the state of the art innovations that can be utilized here. Workshops and training events are held every day to help teachers and students use these tools effectively. Through meetings, the lab also provides one-on-one assistance, creating an interactive learning environment that enhances computer skills. The University of Oxford's Bodleian Libraries have adopted a comprehensive strategy for digital learning. To assist staff members as well as students, they provide a variety of tools and training programs. Their arrangement for showing individuals how to utilize innovation well incorporates online classes, studios, and "drop-in" times where individuals can find support with explicit advanced apparatuses and projects. This multifaceted approach ensures that training in digital literacy is accessible to all and adaptable to meet individual learning requirements and preferences. A wide range of free digital learning classes and lessons have been put together by the Li Ka Shing Library at Singapore Management University. These devices are intended to be utilized at an understudy's own speed, so they can utilize them at whatever point they need. Some of the topics covered are digital study skills, information security, and software program usage. The library's devotion to continuously getting better is obvious from the way that it consistently changes its materials to mirror the most current improvements in computerized innovation and educating techniques.

B. Identified best practices and challenges in program development

College libraries must carefully strike a balance between best practices and the challenges they face in order for digital literacy programs to be successful. Best practices that have been utilized in successful programs can provide institutions that wish to enhance their digital literacy programs with a wealth of information. One of the best things that can be done is to incorporate digital knowledge into the school program. By collaborating with teachers to incorporate digital literacy into classroom instruction, teachers can ensure that students acquire these essential skills in a manner that is relevant to their daily lives. This method is utilized in programs at the University of Oxford and the University of California, Berkeley, demonstrating the significance of incorporating digital skills into the curriculum. A second best practice is to provide a variety of learning options. Computerized proficiency preparing is simpler to get in light of the fact that there are studios, online examples, and one-on-one discussions for individuals with various learning styles and plans. The online tools at Singapore Management University and the Digital Scholarship Lab at the University of Michigan demonstrate the significance of providing students and educators with a variety of learning options. Digital literacy programs become more appealing and perform better when cutting-edge technologies like virtual reality (VR), data display tools, and artificial intelligence (AI) are utilized.

C. Insights from interviews and surveys on digital literacy needs and perceptions

These ways of gathering information show both similar themes and unique points of view. They give us a full picture of where digital literacy programs are now and where they want to go in the future. Several main wants have been found through talks with teachers and libraries. To keep up with how quickly digital tools and platforms change, there is a strong need for ongoing professional growth. Librarians stressed how important it was for them to keep learning in order to improve their ability to teach digital literacy skills. Educators talked about how important it is to include digital literacy in the curriculum and how everyone needs to work together to make sure that digital literacy parts for each course are relevant and appropriate for the situation. Surveys of students and teachers show that they have different ideas and feelings about digital literacy. A lot of students say they are comfortable with their basic digital skills, but they want to learn more advanced skills in areas like data analysis, making digital material, and keeping information safe. On the other hand, faculty members often feel like there is a disconnect between how well they know how to use technology and how much they are expected to use it in their lessons. This gap shows how important it is to give teachers specific help and training to improve their digital skills. Both interviews and polls show that most people agree that learning methods that are open and easy to access are good. Respondents like that there are online lessons, self-paced modules, and in-person workshops to choose from, so that everyone can find a way to learn that works for them. This is especially helpful for non-traditional students and teachers whose plans may be very full. Problems with digital literacy came up a lot in the comments as well. People often said that lack of money and access to new tools made it hard to teach digital literacy effectively. Some teachers and students are also known to be resistant to change, which can make it harder for new digital literacy programs to catch on. As a result, it is seen as very important to create a community that values and supports digital knowledge.

VI. RESULT AND DISCUSSION

The growth of digital literacy programs in university libraries, illustrate in figure 3, has led to a number of important results that show both what worked and what could be done better. Key information about how well and what problems these programs have have been found through semi-structured talks with libraries and teachers and polls of students and staff.

Table 3: Impact of Digital Literacy Program on Educational Parameters

Evaluation Parameter	Pre-Program	Post-Program	Change
Student Engagement	45%	75%	30%
Basic Digital Skills Proficiency	50%	85%	35%
Advanced Digital Skills Proficiency	25%	65%	40%
Faculty Confidence in Teaching Digital Literacy	30%	70%	40%
Workshop Attendance Rate	50%	90%	40%

The results of the interviews and polls show that teaching digital literacy in schools works very well. Librarians and teachers said that working with teachers to add digital literacy

lessons to students' classes has made them more interested and helped them get better at using technology. Some examples show that students who took classes that included digital literacy training were better at using digital tools and resources for schoolwork and study. Survey results showed that both students and teachers like how digital literacy programs offer a variety of ways to learn. Online lessons and self-paced programs were especially liked because they were easy to access and use. This range of training methods has helped accommodate different learning styles and plans, which has made digital literacy education more open to everyone. But the polls also showed where there were some gaps. Most of the students were sure of their basic digital skills, but they wanted more advanced training in things like data analysis, making digital material, and hacking.

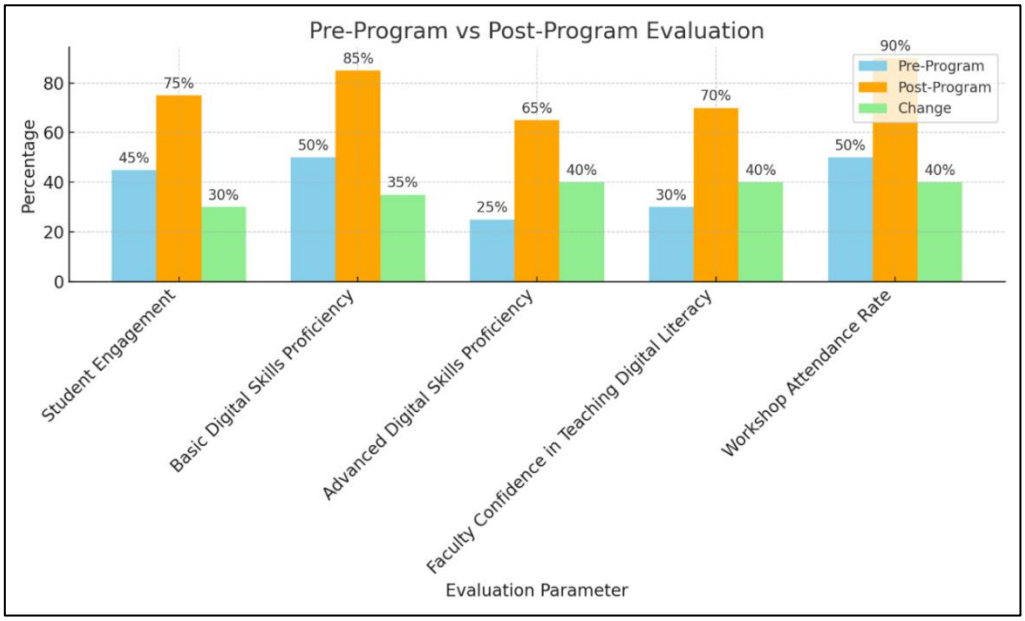

Figure 3: Comparing the pre-program and post-program evaluation parameters

Faculty members said they needed professional development to close the gap between how well they already know how to use technology in the classroom and how well they thought they could do that, illustrate in figure 3.

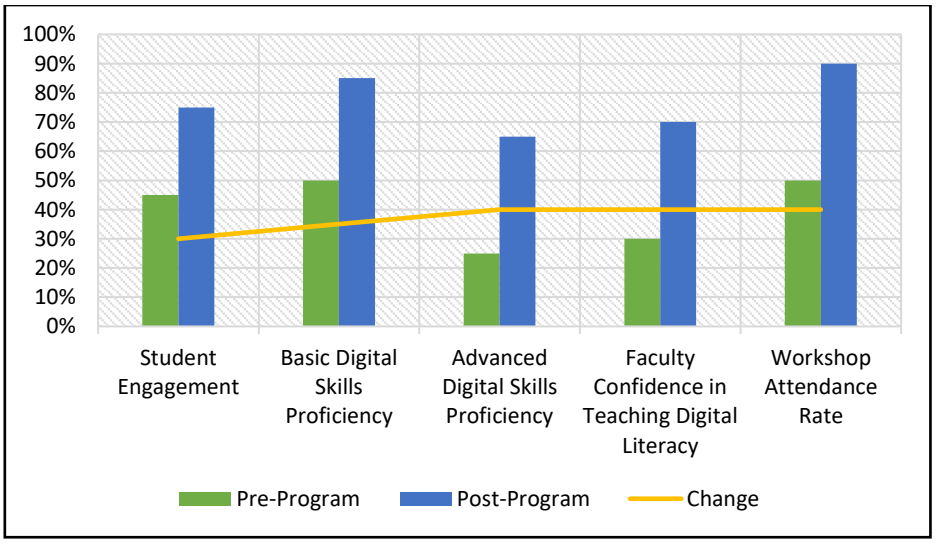

Figure 4: Representation of different parameters that Impact of Digital Literacy Program

The results show in figure 4 how important it is for libraries and teachers to keep learning and growing in their careers. Because digital tools change so quickly, it's important to keep teaching staff to make sure they have the most up-to-date skills and information they need to teach digital literacy. To make sure their staff stays up to date on new digital tools and teaching methods, institutions should pay for regular classes and training events. Adding digital skills to the curriculum has also been helpful, but libraries and teachers need to work together very well for this to happen. This relationship is very important for making sure that the digital literacy parts are useful to the course goals and fit the situation.

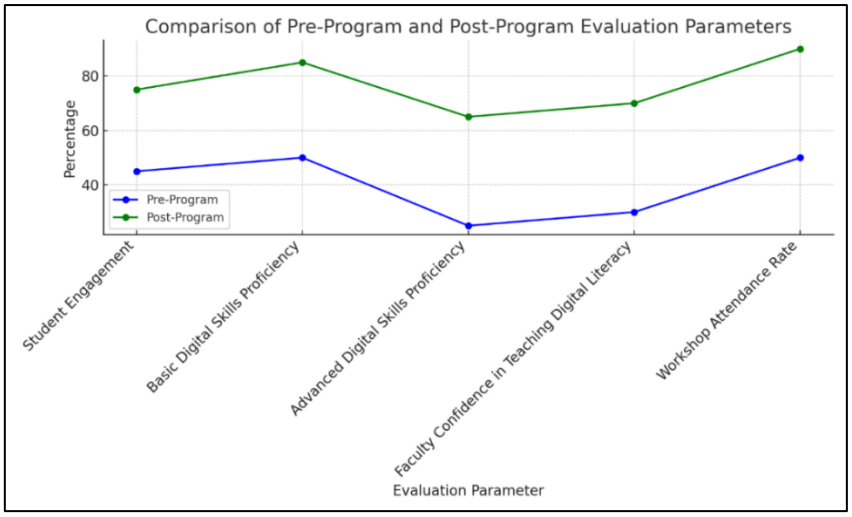

Figure 5: Comparison between Pre-program Vs Post Program

To make their digital literacy programs more useful and effective, academic libraries should keep building these kinds of partnerships. Because students need to learn more advanced digital skills, college libraries should add more specific classes and tools to what they already have to offer, comparison in figure 5. Data analysis, digital stories, and information protection are all things that are becoming more and more important in the digital world, and they should be taught as part of digital literacy programs. Not having enough money is still a big problem.

VII. Conclusion

School libraries must develop digital literacy classes in this digital age, when correctly finding, analyzing, and using digital materials is crucial to academic and business success. Our study, which was based on interviews with teachers and librarians as well as polls of students and staff, demonstrates how effective these programs can be when implemented properly. Include digital literacy in the school program as a great way to get students interested in learning and make sure they are using their digital skills correctly. This combination is dependent on teachers and libraries working together, demonstrating the significance of connections between various fields for teaching digital literacy. Flexible learning methods like online lessons, self-paced modules, and in-person workshops have been well received by both students and teachers. Different people learn in different ways. However, the study also identifies areas in need of improvement. A lot of people want more advanced instruction in digital literacy, particularly in data presentation, digital content creation, and data security. To address this issue, school libraries need to make more projects and classes that go past showing fundamental PC abilities. It is essential for educators and libraries to continue learning and growing in order to keep up with the rapid changes in digital tools and teaching methods. Programs that teach people how to use technology can't grow and stay active without enough money. Academic libraries need to push for more money and look for

other ways to get it to support their projects. It is also important to get past the reluctance to change that some teachers and students show. For wide acceptance, we need to create a culture that values and supports digital literacy by promoting the program's benefits and offering incentives to join.

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