

## TEACHING INFORMATION LITERACY: EFFECTIVE STRATEGIES

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Jagmohan Meena\*

### ABSTRACT

*Being information literate is crucial for today's pupils if they are to become tomorrow's self-directed learners and innovative employees. Current information literacy (IL) pedagogical practices, however, have not necessarily been effective in providing students with the tools necessary for thorough research and memory recall. Therefore, effective instructional strategies are of utmost importance in IL education. The working hypothesis of this study is that students will have an easier time learning IL skills if they are able to include their interests—which are influenced by their dominant intelligences—into their coursework. As a result, the quality of their work would improve. Using a well-established educational approach—Gardner's idea of multiple intelligences—a course was developed to provide students with the IL skills they would need to test these postulates via project work. What followed was a comparison of the two groups' project quality: the experimental and control groups. Project results were much better for students who had received IL instruction that included the use of learning styles.*

**KEYWORDS:** *Information Literacy, Learning Styles, Multiple Intelligences.*

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### Introduction

Enhancing students' information literacy abilities may contribute to the construction of the next generation of knowledge workers and may also encourage more students to engage in self-directed learning. Studies in the field of education have shown that when instructors take into consideration the unique learning styles of their students, the academic performance of their students becomes much better. It has not yet been properly examined whether or whether these strategies are applicable to information literacy education, despite the fact that some research suggests that a successful integrated curriculum could have a favorable impact on the teaching and learning of information literacy. Within the context of such a program, being proficient in information literacy and using efficient instructional strategies would operate together. This article provides studies that investigate the beneficial impacts of combining information literacy into an appropriate educational plan based on Howard Gardner's theory of multiple intelligences. These studies were written by researchers from the United States. Within the context of the study, the engagement of students in group projects acts as the background.

In this article, a summary is provided of a study project that was carried out at two different high schools in Singapore. In the next part, we will discuss the theoretical foundations of the research as well as the historical backdrop of the study. In the parts that follow, both the methodology of the research and the results of the inquiry are broken down in further depth. Following the conclusion of the essay, the authors provide an overview of their recommendations for enhancing information literacy instruction via the implementation of projects.

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\* Master of Library and Information Science, Swami Vivekanand Subharti University, Meerut, U.P., India.

## **Background**

In his presentation to the National Commission on Library and Information Science in 1974, he was the first person to adopt the term "information literacy." It was written by Paul Zurkowski, who was serving as president of the Information Industry Association at the time as the author. According to Zurkowski (1974), those who are "trained in the application of information resources to their work" are considered to be knowledgeable in the field of information. His long-term goal is to create a population that is information-literate, and as a result, he argued for a statewide program to educate this proficiency.

The concept of "information literacy" (IL) has been defined in a variety of different ways in almost every academic book that has been produced on the topic. The definition provided by the American Library Association (1989) has been taken into consideration for the most part in the process of establishing these terminology. The ability to seek for, recognize, evaluate, and make use of knowledge and facts is essential to each and every one of these definitions respectively. With the publication of *A Nation at Risk* in April 1983 (United States Department of Education, 1983), which disclosed findings on the then-current status of education in the United States, the relevance and popularity of IL surged. This growth was particularly noticeable in the education sector. According to the findings of the research, educational institutions and curriculum need significant revisions in order to tackle the issues that are becoming more prevalent in the digital age. The introduction of a number of programs, initiatives, and approaches that are now being used all over the world was made possible as a result of these advanced technologies.

Not only is it impossible to exaggerate the value of mastering IL, but it is also a skill that is essential for success in many other aspects of life. Students that are proficient in IL would be able to study independently and with a focus on themselves, as opposed to having to rely on the teacher to provide answers to their questions or concerns. Instead of being passive users of knowledge, students should grow into critical thinkers and creative problem solvers as a result of this. This should lead to students being more responsible for their own education.

## **Information Literacy in Singapore**

In Singapore, schools at all levels, from elementary to pre-university, are required to adhere to a set of information literacy standards. These standards were developed and published by the School Libraries Unit of the Curriculum Planning and Development Division (CPDD) of the Ministry of Education (Ministry of Education [MOE], 1997a,b). Two of the most important skills that were stressed in the Information Literacy Guidelines were teaching students how to learn and how to think properly. Within the confines of these guidelines, students were instructed on how to study cohesively and think in a reasonable manner. Students should have the ability to take responsibility for their own education, get pertinent knowledge from a variety of sources, and creatively apply what they have learned (MOE, 1997a). If they are capable of doing so, they should be able to do so. Because of this, it is very important to provide children with the abilities that will allow them to continue their education throughout their whole lives. The report contains a lengthy list of things that students in grades K-12 should be able to know and be able to achieve, as well as some expectations for how they should behave. Additionally, the document contained suggestions for incorporating the information literacy program into the school curriculum, standards for performance in information literacy, and a list of requirements for information literacy performance. This paper was expanded with example lesson plans for particular themes at different levels, sample standards for student accomplishment in certain areas, and a program for the school media resource library. In addition, the publication included the information literacy program.

Included in the Information Literacy Supplemental Materials were six examples of courses that could be taught at the high school level and covered a wide range of subjects. Additionally, there were suggestions for how information literacy skills might be incorporated into those classroom sessions (MOE, 1997b). Cooperative learning and learning based on resources were stressed in the activities that were recommended for the class meetings. In accordance with what was mentioned in the previous publication, the purpose of the article was to support the suggestions. A second book, which was also published in 1997 and was named *The Extensive Reading and Information Literacy (ERIL) Programme*, was also published. According to the Ministry of teaching (1997), the initial intention of the ERIL paper was to mainstream English as a second language (ESL) teaching in secondary schools. Reading instruction and other types of information literacy were thus key to the program's original aim. Continuous assessment assignments and post-reading tasks were the two approaches that were included in the ERIL article. Additionally, the publication offered program evaluation criteria, ideas for program design,

and two ways for monitoring students' progress while they were participating in the program. Additionally, a sample work schedule was supplied to the teachers so that they could follow it.

In the classroom, the three books were used briefly by the teachers not long after they were distributed to the students. However, all three of those books did not survive for very long and are no longer made use of in educational settings.

### **Information Literacy and Pedagogy**

There is more to educating kids in Illinois than just instructing them on how to access libraries and other information resources at their disposal. According to Kasowitz-Scheer and Pasqualoni (2022), training in information literacy also includes teaching students how to think critically and analytically. A great number of other authors have provided a comprehensive account of the many instructional methods and programs that have been used in classrooms around the globe, including in the United States of America, Australia, New Zealand, South Africa, and Europe.

### **Information Literacy in the School Curriculum**

Several educational institutions all around the world have made investments in cutting-edge information and communication technologies and infrastructures (Bruce, 2002). This is done with the intention of providing their students with the most beneficial educational experiences that are now available. Even if schools are equipped with cutting-edge technology, there is no assurance that both students and teachers will be able to properly utilize it and develop their information literacy skills. In order for students and teachers to get the most possible advantages from learning, it is essential to combine instruction in foreign languages with the use of educational technology.

### **Pedagogy**

Paedagogy is the term used to describe the process by which a teacher imparts new knowledge and abilities to his students. It has been observed by Cognard that in order to make the curriculum more accessible to the students, instructors incorporate their own vision, style, values, knowledge, and wisdom into the curriculum. This is done in order to make the curriculum more accessible to the students. In the vast majority of cases, the manner in which students are instructed has a considerable influence on the amount of information that they acquire as well as the substance that they learn. The manner in which students are instructed, in addition to the content and information that is delivered, will have an effect on the amount of information that they retain and how well they recall it. The technique that professors use while teaching a particular class is significantly influenced by the learning styles of the students who are enrolled in that particular topic. Because of this, teachers need to have a solid understanding of the many learning styles that are out there in order to be able to adapt their instructional strategies to each individual student.

Behaviorism, constructivism, and relationalism are the three primary schools of thought related to IL, according to Bruce (1997), who detailed the many different educational approaches to IL. The constructivist method is founded on the cognitive orientation to learning, which places an emphasis on the processing and recollection or recall of information. On the other hand, the behaviorist approach views learning as a process in which an external stimulus induces a change in the behavior of the learner in a direction that is intended. The relational approach to information literacy (IL) was developed by Bruce (1997) as a reaction to the reality that the experiences and uses of information that individuals have change depending on the context in which it is required. According to her, there are seven distinct perspectives on information literacy. These perspectives are as follows: (i) the technology perspective; (ii) the sources of information; (iii) the information process; (iv) the control of information; (v) the knowledge construction; (vi) the extension of knowledge; and (vii) the wisdom perspective. According to her, depending on the context, any concept may be experienced either autonomously or in relation to all of the others together.

### **Learning Theories**

When it comes to educational theory, there are four main schools of thought. Among these theoretical frameworks are humanism, behaviorism, cognitivism, and social/situational learning theory (according to Smith, 1999, which describes Merriam and Caffarella, 1991). The bulk of these theories of learning have tended to see learning more as a process than an outcome of that process.

Because of his proposal of the stimulus-response paradigm, Watson (1913) is considered a behaviorist pioneer. Since Skinner (1938) developed operant conditioning and enlarged Watson's

concept, he is considered a behaviorist. To put it simply, the cognitive orientation is all about the learner's internal understanding. The field of cognitivism has been greatly influenced by a number of influential thinkers, such as Piaget (1929) and his genetic epistemology, Bruner (1977) and his theory of constructivism, which emphasizes the importance of building upon existing ideas and information, and Feuerstein (1980) and mediated learning experience, which suggest that one's intelligence can be changed by being exposed to the right stimuli and environments, with the mediation of a third party.

Instead than concentrating just on the cognitive development of the learner, the humanistic approach places a strong emphasis on the learner's whole development, which encompasses their emotional and intrapersonal growth respectively. In 1943, Maslow, the most well-known humanistic thinker, proposed a theory of human motivation that claims that in order to be able to satisfy higher-order, psychological desires, one must first guarantee that one's basic, physiological requirements are met. This theory states that in order to be able to fulfill higher-order, psychological goals, one must achieve this.

All aspects of a learner's social and interpersonal growth, as well as their own personal improvement, are included in the social and situational orientation. Vygotsky (1962) established the concept of the zone of proximal development, which states that intelligence is a process activity that is modified by interactions and experiences. Bandura (1977) created the concept of observational learning, which is learning by seeing what experienced people do. Both of these ideas were presented by Vygotsky. It is important to note that both of these scholars are significant advocates of this paradigm.

Understanding the various learning theories is necessary for everyone who is interested in understanding how to teach skills related to information and communication. On the other hand, it is beneficial and equally vital to have information about the many learning styles that children have in order to be able to adapt to the preferences of each child individually.

### **Learning Styles**

Those learning styles that are based on information processing, those that are based on personality, and those that are based on multi-dimensional preferences in teaching are the three primary kinds of learning styles, as stated by Yeap et al. (2005). In a broad sense, the information processing-based learning style assesses the manner in which individuals think about and make sense of information. This category of learning styles is more likely to represent individual variations in detecting, perceiving, problem-solving, organizing, and retaining information. Different people have different ways of doing these things.

When compared to other learning styles, the personality-based learning style examines how individuals' distinctive characteristics influence the ways in which they prefer to take in and make sense of new information. Evaluation of how individuals react to different kinds of learning settings may be facilitated by the use of this collection of learning styles.

### **Objectives**

- To study teaching literacy
- To study teaching information literacy: effective strategies

### **Methodology**

To investigate the viability of this idea, the first author studied two secondary schools in Singapore. Students in the Secondary 3 Express stream (ages 14–15) were permitted to participate since they had assignments to do for school. We selected three or four groups of students from each school who were relatively equivalent to one another in terms of their academic ability (that is, who had previously participated in the same classes and had fared similarly on standardized exams). The pre-intervention test was administered to each and every one of the selected courses. The control cluster was comprised of a single class that was selected at random and did not take part in the intervention (for instance, instruction in language learning). Throughout the duration of the remaining classes, students received instruction in the principles of information literacy, which would prove to be beneficial to them while they worked on their projects. This training lasted for a total of five weeks. A few examples of these abilities are familiarity with print and digital sources of information, knowledge of how to organize and search for specific types of data, the ability to create and refine search strategies, proficiency with robotic search engines and online databases, the ability to evaluate information and its sources, and the ability to use and abuse data.

After the other groups had finished their information literacy instruction for five weeks and had taken the multiple intelligences test (Appendix 3), two courses were chosen at random. Each kid in these two groups was allocated to one of two clusters based on their main intellect.

**Table 1: Respondent Breakdown According to IL Training and Experimental Groups**

	No. of students	Percentage
No IL training	77	28.1
IL training	197	71.9
Random	36	13.1
Homogeneous	81	29.6
Heterogeneous	80	29.2

**Table 2; Response Rates**

	No. of Students	Percentage
Pre-test	242	88.3
Post-test	248	90.5
Valid cases for pre- and post-tests	219	79.9
Completed and submitted projects	224	81.8

Students who had dominant intelligences that were comparable to one another were assigned to work together in one class, while students who had very different dominant intelligences were divided apart in the other class. Students who were still enrolled in the class and had engaged in the IL training for a period of five weeks were randomly allocated to groups by their respective professors.

The students in the homogeneous or heterogeneous cluster were urged to utilize their dominant intellect, which is connected to their interests, in order to finish their project work. This was done in order to drive their learning, find extra information, and solidify what they had acquired.

It was necessary to have an entrepreneurial attitude in order to complete the capstone project for the first school. To be more specific, students worked together in smaller groups to investigate previously successful locally manufactured things on a global scale. Following this, they proposed a new product that they believed would be successful in this market.

**Table 3: Percentage of Pre- and Post-Intervention Mean Scores on the IL Test (control vs. experimental)**

	Pre	Standard Deviation	Post	Standard Deviation	p-value (Paired)
No IL training	28.7	10.98	31.4	11.61	0.113
IL training	26.9	12.12	36.2	10.80	0.000

Education in civics was the focus of the project work that was completed at the second school. More specifically, students worked together in smaller groups to come up with socially and ethically responsible alternatives to the construction of casinos in Singapore. Problems such as gambling addiction, illicit money lending, and shattered families would all be addressed simultaneously by these choices.

Following the conclusion of the activities associated with the project, the post-intervention examination was administered to each of the selected classes.

### Findings

Two hundred and forty-four students took part in the research. Table 1 indicates that 197 students participated in the IL training in total. Conversely, 77 students served as controls, participating in no IL instruction all.

Table 2 indicates that the pre- and post-intervention assessments received 242 (88.3%) and 248 (90.5%) answers, respectively, indicating a rather high response rate. The examination of the data only included students who had completed both the pre-intervention and post-intervention assessments. Regrettably, only 224 students were able to finish and turn in their projects before the deadline.

The average pre- and post-intervention test scores of students who took part in IL instruction and those who did not are contrasted in Table 3. Furthermore, the disparity between the two sets of

scores is also shown. The results show that the group of students who did not participate in IL training performed significantly better overall on the pretest (mean = 287). However, compared to certain other pupils, the post-test scores of the students who had received instruction in IL were significantly higher ( $m = 36.2$ ). A paired samples t-test was performed on the data, and the results showed a level of significance of 0.000. If this is the case, the separation between the

**Table 4: Percentage Mean of the IL Test Results before and after the Intervention (with IL Training Alone)**

	Pre	Standard Deviation	Post	Standard Deviation	p-Value (Paired)
Random grouping	19.3	10.41	33.0	11.44	0.000
Homogeneous grouping	25.9	11.98	36.1	10.23	0.000
Heterogeneous grouping	32.3	10.62	38.0	10.76	0.002

**Table 5: Average Project Evaluation Scores (Control vs Experimental)**

	No. of Students	Percentage Means of Evaluation Marks	SD	Standard Error
No IL training	32	33.3	7.74	1.37
IL training	157	48.6	14.27	1.14
p-value(independent)	0.000			

**Table 6: Average Results for Project Assessment (Excluding of IL Training)**

	No. of Students	Percentage Means of Evaluation Marks	SD	Standard Error
Random grouping	23	32.0	8.31	1.73
Homogeneous grouping	71	52.1	14.12	1.68
Heterogeneous grouping	63	50.8	11.86	1.49
p-value	0.000			
(ANOVA)				

Rather than being the result of random fluctuations, the results before and after the intervention are a reflection of the impact that the training had on the participants.

The results of comparing the averages of the students' test scores before and after the intervention are shown in Table 4. Additionally, information on the disparities between the various student groups is also included in this table. It is clear from the paired samples t-test p-values that there is a significant difference between the pre- and post-scores for the groups that were given instruction in independent learning.

A comparison of the averages of the project evaluation marks from students who received IL instruction to those who did not get such training is shown in Table 5 in order to determine whether or not there are any noteworthy differences. Based on the findings of the impartial examiners, it was shown that students who got training in IL fared better on the project than those who did not get instruction ( $m = 33.3$  vs. 48.6). The independent samples t-test p-value demonstrates that there is a statistically significant difference between the two groups of students' project evaluation ratings from the two different groups of students.

There is also a comparison of the average marks that each student group received on the project evaluation, which can be seen in Table 6. The findings indicated that, across all of the groups, the students who were most closely grouped demonstrated the highest level of performance ( $m = 52.1$ ).

Upon examining the project assessment rubrics that were filled out by the impartial examiners, it was discovered that there are four elements that reflect the English Language abilities of the pupils. In the next step, these parameters were evaluated according to whether or not the students had received instruction in IL (Table 7) or their groups (Table 8). On a scale that ranged from one (extremely low) to five (very high), a score was given to each individual component.

During the process of doing an independent samples t-test on each measure, we discovered that there was a substantial difference between the students who had gotten training in IL and those who had not; the p-values for these variables were absolutely 0.000.

In a similar vein, the p-values that were obtained from the one-way analysis of variance for each component were much lower than the 0.05 threshold of significance. This illustrates that the groups that the students are a part of have a significant influence on the performance of the pupils.

**Table 7: Evaluation of Project Reports (Experimental vs control)**

Report element		No IL Training				With IL Training				p-Value
		n	Mean Score	SD	Std Error	n	Mean Score	SD	Std Error	
1.	Use of various information sources	32	1.6	0.52	0.09	157	2.1	0.68	0.05	0.000
2.	Use of reliable and authoritative information	32	1.7	0.64	0.11	157	2.5	0.87	0.07	0.000
3.	Use of proper citations	32	1.4	0.74	0.13	157	2.2	0.86	0.07	0.000
4.	Inclusion of complete bibliography	32	1.2	0.37	0.06	157	2.3	1.04	0.08	0.000

**Table 8: Project Report Analysis (with IL Training only)**

Report Element		Random Grouping				Homogeneous Grouping				Heterogeneous Grouping				p-Value
		n	Mean	SD	Std	n	Mean	SD	Std	n	Mean	SD	Std	
		Score	Error	Score	Error	Score	Error	Score	Error					
1.	Use of various information sources	23	2.0	0.84	0.18	71	2.1	0.62	0.08	63	2.1	0.68	0.05	0.002
2.	Use of reliable and authoritative information	23	2.5	0.95	0.20	71	2.5	0.95	0.11	63	2.3	0.73	0.09	0.000
3.	Use of proper citations	23	2.1	0.78	0.16	71	2.2	0.96	0.11	63	2.2	0.77	0.10	0.000
4.	Inclusion of complete bibliography	23	1.5	0.71	0.15	71	2.5	1.00	0.12	63	2.3	1.07	0.13	0.000

## Discussion

Certain inferences and certain conclusions may be drawn from the facts. It is feasible to derive certain conclusions. Both Table 3 and Table 5 demonstrate that students' knowledge and skills are impacted by independent learning (IL) training. Additionally, Table 5 demonstrates that students' project evaluation ratings are impacted by IL training, which ultimately results in better quality work. According to Lance (2001) and Scott and Plourde (2007), one of the most widely held beliefs in the independent learning (IL) community is that IL training helps students enhance their academic performance by growing their expertise.

The fact that the experimental groups of students who participated in the research had different levels of performance on exams and assessments of their projects is a more significant finding by itself. To be more specific, class 2 (the group that got just IL training) had the lowest pre-test scores but the greatest post-test scores when compared to class 1 (the group that did not get any IL training) (Table 4).

Due to the fact that all of the students in class 2 had the same training in IL, it is reasonable to assume that the students in class 3 and class 4 should have achieved results that were comparable to those in class 2. However, in the post-test, classes 3 and 4 did better than class 2, despite this fact. There is a possibility that their higher performance might be attributed to the fact that they made more use of their dominant intelligences in order to study integrated learning and remember more of what they learnt.

During the analysis of the reports, it was shown that students who had gotten education in IL consistently fared better than their peers who had not received training in any of the four criteria. The fact that students have increased their ability to use a range of sources, present information that is reliable and authoritative, properly cite their sources, and provide a full bibliography is evidence of the effectiveness of teaching in information literacy. Moore (2001) discovered that one of the ways in which students exhibit a solid grasp of the research process is by the quality of the bibliographies that they provide in their written reports while they are learning IL.

Furthermore, across all of the different experimental groups, students who were classified according to their dominant intelligences (also known as learning styles) scored higher ratings for three of the four components that were specifically designed for students who had received instruction in IL. The use of learning styles, which may be adequately assessed, have a favorable impact on the level of research process mastery that students achieve.

### Conclusion

IL abilities are widely acknowledged to have the potential to assist students in their academic pursuits and as they develop into self-directed professionals and academics. The teaching of IL skills, on the other hand, cannot be determined by chance or improvisation. Instead, it must be backed by research, meticulously structured, and paired with efficient instructional strategies in order to ensure that students learn, remember, and apply the information that they acquire. There is a high probability that the integration of IL teaching strategies with robust pedagogical procedures will result in increased academic achievement, as well as improved student learning and the application of skills in a variety of activities and tasks.

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