

Effectiveness of the SECI Knowledge Management Model in Enhancing Critical Thinking, Information Literacy, and Career Readiness Skills among Higher Secondary School Students

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Abstract

In today's knowledge-based society, students need to develop critical thinking, information literacy, and career readiness skills to respond effectively to the changing demands of the employment sector. Therefore, educational practices should provide greater opportunities for the creation and application of knowledge rather than focusing solely on its transmission. This study examined the effectiveness of the SECI Knowledge Management (KM) model in enhancing critical thinking, information literacy, and career readiness skills among higher secondary students. A pre-test, post-test, follow-up test control group experimental design was adopted. Sixty higher secondary students were assigned to experimental and control groups. The experimental group received instruction through the SECI KM Model, whereas the control group was taught using the prevailing activity-based approach. The results showed significant improvements in critical thinking, information literacy, and career readiness skills among students in the experimental group. The follow-up test results indicated that these skills were retained over time. The findings suggest that the SECI KM model is effective in developing skills that are relevant to contemporary workplace requirements.

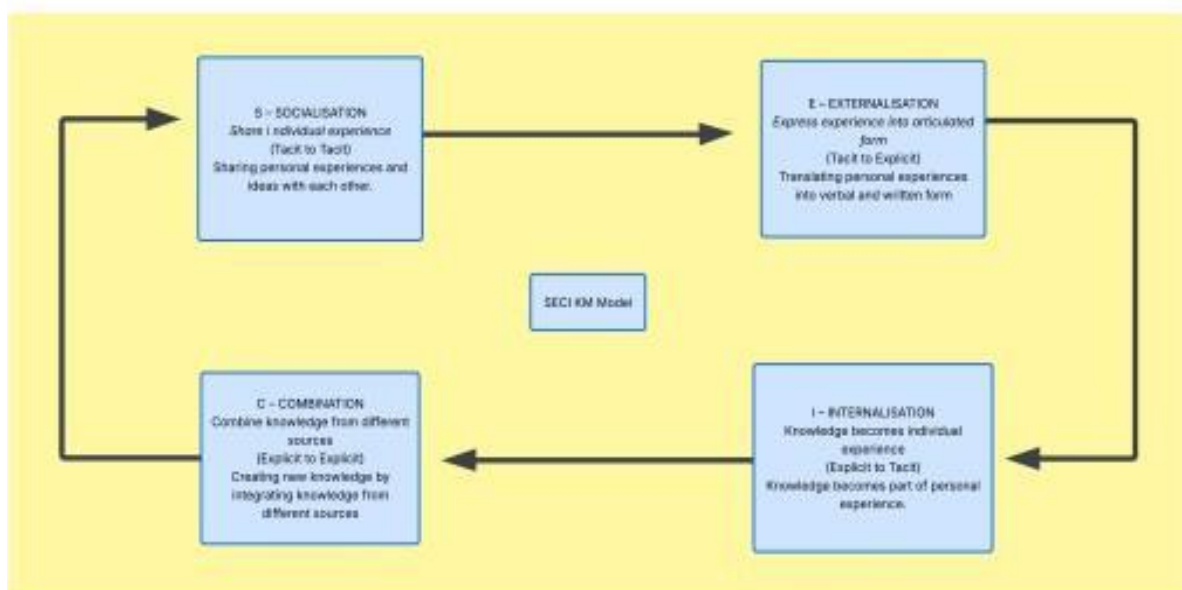
Keywords: SECI KM model, critical thinking, information literacy, career readiness

Introduction

The traditional view that knowledge alone is sufficient for success in life has gradually shifted toward an increased emphasis on the importance of skills. Students, once regarded primarily as consumers of knowledge, are now expected to function as creators and users of knowledge. In response to the changing demands of the global workforce, it is essential to equip students with skills that are relevant to contemporary professional and social contexts. The ability to evaluate, analyze, and apply knowledge has become increasingly important in the digital era.

One of the most widely recognized frameworks in the field of knowledge management is the SECI Model, developed by Nonaka and Takeuchi (1995). The model explains how tacit knowledge derived from personal experiences is transformed into explicit knowledge and subsequently internalized as tacit knowledge through individual experience. Learning within this framework is based on four interconnected processes: knowledge creation, knowledge sharing, knowledge integration, and knowledge application (Nonaka & Takeuchi, 1995).

Figure 1
SECI Knowledge Management Model – Knowledge Conversion Phases



Source: Adapted and prepared by the researcher based on Nonaka and Takeuchi (1995).

- Socialization - Sharing personal experiences and ideas among individuals.
- Externalization - Converting personal and collective experiences into oral and written forms.
- Combination - Generating new knowledge through the integration of knowledge acquired from multiple sources.
- Internalization - Internalizing knowledge as part of personal experience.

The Kerala Higher Secondary Education curriculum provides opportunities for students to collect, analyze, and interpret information and to draw conclusions based on evidence. However, the adoption of innovative teaching models remains limited. In many classrooms, teaching continues to rely primarily on textbook-centered lecture methods. Most studies based on the SECI Knowledge Management Model have been conducted in higher education settings, while experimental research at the higher secondary level remains scarce. In addition, only a limited number of studies have examined the effectiveness of the SECI model through follow-up assessments. The present study aims to address this gap in the literature.

Review of Related Literature

Nonaka and Takeuchi (1995) developed the SECI KM model to explain the process of transformation between individual and collective knowledge. Learning is a continuous social process that helps individuals create and develop knowledge (Nonaka & Takeuchi, 1995). The creation of new knowledge occurs through the integration of tacit and explicit knowledge (Nonaka & von Krogh, 2009). Communication, sharing experiences, and collaboration are important processes in knowledge creation. Knowledge is generated through active interaction between individuals and their social environment (Nonaka et al., 2000). Critical thinking helps students make informed decisions based on evidence by analyzing information obtained from a variety of sources. It enhances students' analytical and decision-making abilities (Facione,

1990). Critical thinking is an essential skill that students require in diverse learning situations. According to Halpern (1998), critical thinking can be developed through experiential learning and systematic training. Information literacy is an essential skill in today's digital society. ACRL (2016), which highlights the ability to collect, evaluate, organize, and effectively use information as an essential component of information literacy. Career readiness is achieved through the development of competencies such as communication, problem-solving, and collaboration. Dacre Pool and Sewell (2007); Succi & Canovi (2020) emphasized that employability is influenced by a combination of knowledge, skills, experience, and personal attributes.

Objectives

- To find out the effectiveness of the SECI model in developing critical thinking of higher secondary school students.
- To examine the effectiveness of the SECI model in developing information literacy of higher secondary school students.
- To find out the effectiveness of the SECI model in developing career readiness of higher secondary school students.
- To examine the long-term retention of critical thinking, information literacy, and career readiness skills among higher secondary school students through a follow up assessment.

Hypotheses

- There is no significant difference between the experimental group and the control group in the pre-test scores.
- There is no significant difference between the experimental group and the control group in the post-test scores.

- There is no significant difference between the experimental group and the control group in the follow-up test scores.
- There is no significant difference between the post test and follow up test scores of higher secondary school students exposed to the SECI knowledge management model.

Methodology

An experimental research method was adopted for the study. A pre-test, post-test, and follow-up test experimental design was employed to examine the effectiveness of the SECI Knowledge Management (KM) Teaching Model. The population comprised Plus Two students enrolled in Higher Secondary Schools in Kerala. A sample consisting of sixty Plus Two Humanities students from a Government School in Alappuzha District was selected for the study. The sample was chosen using purposive sampling and random assignment techniques. Data were analyzed using statistical measures such as the mean, standard deviation and t-test.

Procedure

Pre-test → SECI KM Model-Based Intervention (Experimental Group) / Activity-Based Teaching (Control Group) → Post-test → Follow-up Test → Data Analysis.

Tools

1. Critical Thinking Scale

The purpose of Critical Thinking Scale is to measure the dimensions of analysis, reasoning, evaluation, and interpretation among higher secondary school students. The scale was developed by the investigator.

2. Information Literacy

The purpose of this Information Literacy Scale is to measure the skills of selecting, evaluating, and applying information among higher secondary school students. The scale was developed by the investigator.

3. Career Readiness

The purpose of this Career Readiness Scale is to measure the communication,

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problem-solving, collaboration, decision-making and career awareness skills of higher secondary school students. The scale was developed by the investigator.

4. SECI KM based Instructional design

The SECI Knowledge Management (KM) Model-based instructional design was prepared in four phases. In the socialization phase, students share their own experiences with one another. The discussion presents the topic of study as a social problem. In the externalization phase, experiences are transformed into ideas and facts. Students engage in activities such as preparing concept maps, writing reflection notes, and conducting case analyses. In the combination phase, knowledge collected from various sources is integrated and organized. Students engage in activities such as data collection, digital resource integration, and report preparation. In the internalization phase, knowledge is applied to real-life situations. Students engage in problem-solving activities to facilitate the practical application of acquired knowledge.

Validity and Reliability

The scale and instructional design were developed after obtaining the opinions of experts in the fields of knowledge management and education. A pilot study was conducted, and the reliability of the scale was established using Cronbach's Alpha. The obtained Cronbach's Alpha values were above the acceptable level of 0.70, indicating satisfactory reliability of the instruments. The overall reliability coefficient of the scales was found to be 0.82. It reveals that the tools were reliable for the study.

Analysis and Interpretation

Table 1

Comparison of Pre-Test Scores in Critical Thinking, Information Literacy, and Career Readiness

Variables	Group	N	Mean	SD	t Value	p Value
Critical Thinking	Experimental	30	14.50	2.41	0.166	0.869
	Control	30	14.43	2.17		
Information Literacy	Experimental	30	14.47	2.42	0.220	0.827
	Control	30	14.33	2.28		
Career Readiness	Experimental	30	14.40	2.37	0.328	0.744
	Control	30	14.20	2.35		

The mean pre-test scores of the experimental and control groups for critical thinking were 14.50 (SD = 2.41) and 14.43 (SD = 2.17), respectively. Similarly, the mean pre-test scores for information literacy were 14.47 (SD = 2.42) and 14.33 (SD = 2.28), while the mean pre-test scores for career readiness were 14.40 (SD = 2.37) and 14.20 (SD = 2.35), respectively. The pre-test results revealed no significant differences between the experimental and control groups in critical thinking, $t(58) = 0.17$, $p = 0.869$; information literacy, $t(58) = 0.22$, $p = 0.827$; and career readiness, $t(58) = 0.33$, $p = 0.744$. These findings indicate that the groups were homogeneous prior to the intervention.

Table 2

Comparisons of Post-Test Scores in Critical Thinking, Information Literacy and Career Readiness

Variables	Group	N	Mean	SD	t Value	p Value
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Critical Thinking	Experimental	30	44.00	4.32	14.062	<0.001
	Control	30	30.62	2.80		
Information Literacy	Experimental	30	43.90	4.33	13.439	<0.001
	Control	30	30.79	3.02		
Career Readiness	Experimental	30	43.87	4.50	12.954	<0.001
	Control	30	30.83	3.07		

The mean post-test score for critical thinking was 44.00 (SD = 4.32) for the experimental group and 30.62 (SD = 2.80) for the control group. The difference between the groups was statistically significant, $t(57) = 14.06$, $p < 0.001$. Similarly, the mean post-test score for information literacy was 43.90 (SD = 4.33) for the experimental group and 30.79 (SD = 3.02) for the control group, with a statistically significant difference, $t(57) = 13.44$, $p < 0.001$. The mean post-test score for career readiness was 43.87 (SD = 4.50) for the experimental group and 30.83 (SD = 3.07) for the control group. The difference was also statistically significant, $t(57) = 12.95$, $p < 0.001$. These findings indicate that the experimental group performed significantly better than the control group on all three variables following the intervention. The SECI Knowledge Management (KM) Model-Based Instruction was found to be effective in enhancing critical thinking, information literacy, and career readiness among higher secondary school students.

Table 3

Comparisons of Follow up Test Scores in Critical Thinking, Information Literacy and Career Readiness

Variables	Group	N	Mean	SD	t Value	p Value
Critical Thinking	Experimental	30	43.53	4.49	14.169	<0.001
	Control	30	28.97	3.29		

Information Literacy	Experimental	30	43.57	4.53	14.306	<0.001
	Control	30	29.00	3.14		
Career Readiness	Experimental	30	43.23	4.64	11.868	<0.001
	Control	30	29.21	4.43		

The mean follow-up test score for critical thinking was 43.53 (SD = 4.49) for the experimental group and 28.97 (SD = 3.29) for the control group. The difference between the groups was statistically significant, $t(57) = 14.17$, $p < 0.001$. Similarly, the mean follow-up test score for information literacy was 43.57 (SD = 4.53) for the experimental group and 29.00 (SD = 3.14) for the control group, with a statistically significant difference, $t(57) = 14.31$, $p < 0.001$. The mean follow-up test score for career readiness was 43.23 (SD = 4.64) for the experimental group and

29.21 (SD = 4.43) for the control group. The difference was also statistically significant, $t(57) = 11.87$, $p < 0.001$. These findings indicate that the positive effects of the SECI Knowledge Management Model-Based Instruction on critical thinking, information literacy, and career readiness were sustained over time.

Findings

There was no significant difference between the pre-test scores of the experimental and control groups in critical thinking, information literacy, and career readiness. A significant increase was observed in the critical thinking, information literacy, and career readiness scores of the experimental group compared to the control group. These findings indicate that the SECI Knowledge Management (KM) Model is effective in enhancing critical thinking, information literacy, and career readiness among higher secondary school students. The experimental group was able to maintain the gains achieved in the post-test during the follow-up test. Critical thinking, information literacy, and career readiness among higher secondary school students

increased significantly in the experimental group and were sustained through the follow-up test. Therefore, the SECI Knowledge Management (KM) Model can be considered a novel instructional approach for higher secondary humanities education.

Discussion

The SECI Knowledge Management (KM) Model was found to be effective in developing critical thinking, information literacy, and career readiness skills among higher secondary school students. The evidence from the study showed that students in the experimental group obtained higher scores in both the post-test and the follow-up test compared to those in the control group. This improvement may be attributed to the active involvement of students in knowledge-sharing, knowledge-creation, knowledge-integration, and knowledge-application activities throughout the intervention.

The findings of the present study are consistent with the fundamental principles of the SECI Knowledge Management Model proposed by Nonaka and Takeuchi (1995). The findings of the present study are consistent with the views of Nonaka et al. (2000), who argued that collaborative learning environments facilitate knowledge sharing, knowledge creation, and meaningful learning experiences among learners. Such experiences may have contributed to the significant improvement observed among the students.

The significant enhancement in critical thinking skills is in line with the views of Facione (1990) and Halpern (1998), who emphasized the importance of analytical reasoning, evaluation, and evidence-based decision-making in the development of critical thinking. The SECI KM Model encouraged students to gather information, examine evidence, and draw logical conclusions, thereby promoting higher-order thinking skills. Similarly, information literacy skills improved significantly among students exposed to the SECI KM Model. The findings of the present study

support the views of ACRL (2016), which highlights the ability to collect, evaluate, organize, and effectively use information as an essential component of information literacy. These findings support the view that active engagement in knowledge-related activities contributes to the development of information literacy. The findings of the present study support the views of Dacre Pool and Sewell (2007) and Succi and Canovi (2020), who highlighted communication, collaboration, problem-solving and other employability skills as essential components of career readiness. The learning experiences provided through the SECI KM Model offered opportunities for students to practice and strengthen these competencies. Therefore, the findings of the present study support the view that knowledge-creation-based learning can contribute to the development of employability-related skills.

Overall, the SECI KM Model may be regarded as an innovative instructional approach that promotes knowledge creation and application among higher secondary school students. The model facilitates active participation in the learning process and contributes to the development of essential twenty-first-century skills.

Educational Implications

At the higher secondary level, subjects such as Humanities, which are often perceived as less interesting by students and are less frequently chosen by high-achieving students, can be taught effectively using the SECI Knowledge Management (KM) Model and model-based learning activities. It is beneficial to incorporate activities based on the SECI KM Model into teacher education programmes and in-service training programmes. The SECI KM Model views students as creators of knowledge rather than mere consumers of knowledge. Since the model is grounded in constructivist principles, it is compatible with the school curriculum in India. The SECI Knowledge Management (KM) Model aligns with the recommendations of India's National

Education Policy (NEP) 2020 and the vision of Mission 2047. The model promotes experiential learning, critical thinking, problem-solving, collaboration, and knowledge creation through learner-centred activities. Therefore, the SECI KM Model can serve as an effective instructional approach for achieving the educational goals envisaged in NEP 2020 and Mission 2047.

Conclusion

The study demonstrated that the SECI Knowledge Management (KM) Model had a significant impact on the development of critical thinking, information literacy, and career readiness. Its effectiveness was also found to be long-lasting, as evidenced by the follow-up test results. The findings provide empirical evidence that the SECI KM model is an effective pedagogical approach for fostering higher order thinking and employability skills among higher secondary school students. The model offers a practical framework for interacting knowledge creation, collaboration and application within school education.

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