

## Consideration and the Content of “Informatics” Which Was Introduced From 2025 in the Common Test for University Admissions in Japan

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The IAFOR International Conference on Education in Hawaii 2026  
Official Conference Proceedings

### Abstract

In 2025, “Informatics” was newly included as a required subject in the Common Test for University Admissions (CTUA) in Japan, which is used by all national and public universities and many private institutions. While “Informatics” has been a compulsory high school subject since 2003, it was long treated casually due to its exclusion from university entrance exams. This paper examines the educational significance of including “Informatics” in CTUA by analyzing the structure and content of the first-year exam taken by over 300,000 students, with an average score of 70%. The exam covers four key areas of “Informatics I”: (1) Problem-solving in the Information Society, (2) Communication and Information Design, (3) Computers and Programming, and (4) Information Networks and Data Utilization. The authors evaluated the exam items based on content balance, cognitive demand, and alignment with the high school curriculum. This analysis shows a well-balanced approach in addressing both conceptual understanding and applied skills, marking a significant shift in digital education policy. This inclusion has stimulated renewed attention to informatics education at the high school level and raised questions regarding curriculum alignment and teacher preparedness. The findings offer valuable insights into how national testing policies can drive curriculum reform and digital literacy education, with potential relevance to international contexts where informatics is still emerging.

*Keywords:* informatics education, curriculum reform, the Common Test for University Admissions in Japan (CTUA), information literacy, cross-disciplinary learning

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### Introduction

In recent years, informatics education has gained increasing importance worldwide as digital technologies reshape both society and education. Japan has introduced substantial reforms to its national curriculum and university entrance examinations in order to enhance students’ information literacy, computational thinking, and data utilization skills. A notable development is the introduction of the subject “Informatics I” into the Common Test for University Admissions.

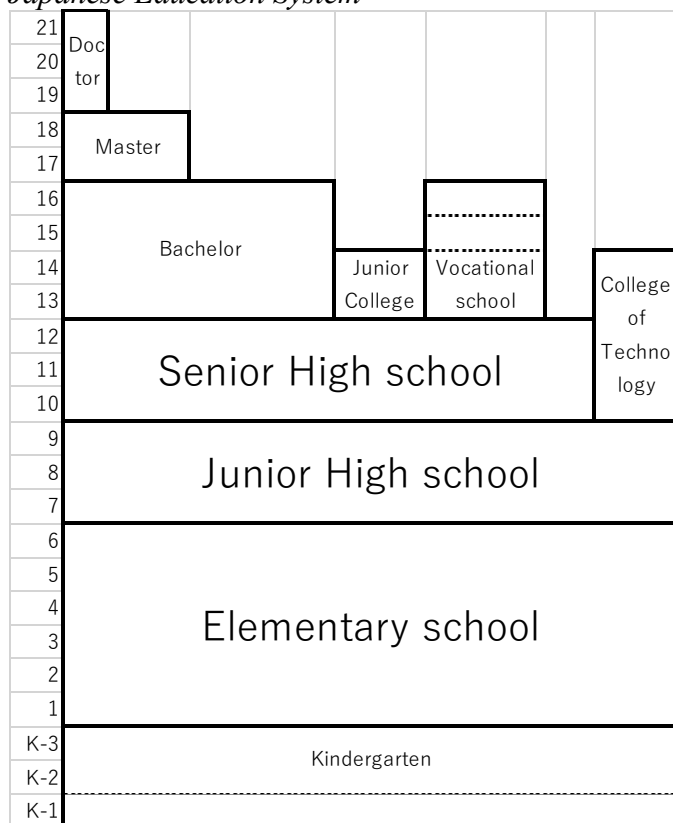
This paper aims to (1) provide an overview of Japan’s educational structure and ongoing curriculum reforms related to informatics education, (2) analyze the characteristics of the newly introduced Informatics I examination, and (3) discuss its implications for teaching, learning, and assessment in the context of contemporary information society.

### Overview of the Japanese Education System and Curriculum Reform

#### Structure of the Education System

The Japanese education system is generally structured as follows: kindergarten (2–3 years), elementary school (6 years), junior high school (3 years), senior high school (3 years), undergraduate programs (4 years), master’s programs (2 years), and doctoral programs (3 years). In addition to this standard pathway, alternative options are available, including colleges of technology (5 years), junior colleges (2 years), and vocational schools (2–4 years) (Figure 1).

**Figure 1**  
*Japanese Education System*



Primary and secondary education—from kindergarten through upper secondary school—is conducted in accordance with the national curriculum guidelines prescribed by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). These curriculum guidelines are revised approximately every ten years, and preparations for the next revision are currently underway.

At present, informatics education in Japanese primary and secondary education is implemented within “Integrated Studies” at the elementary level, within “Technology and Home Economics (Technology field)” at the lower secondary level, and within the “Informatics” subject at the upper secondary level. This paper first provides an overview of how these components are expected to change in the forthcoming curriculum revision currently under discussion.

### **Informatics Education in Elementary Schools**

In elementary schools, informatics education is conducted mainly within “Integrated Studies,” where cross-curricular and interdisciplinary themes addressing contemporary issues—such as international understanding, information, environment, welfare, and health—are explored. A proposed reform seeks to divide these into a “Inquiry domain” and an “Information domain.” The Information domain would be further organized into small learning units called “Information Blocks,” which focus on fundamental information technology concepts, and “Mini Inquiry Units,” in which students learn and apply elements of information literacy through inquiry processes. This structure aims to substantially improve students’ information literacy at the elementary level.

### **Informatics Education in Junior High Schools**

At the lower secondary level, the current “Technology and Home Economics” subject is expected to be divided into “Home Economics” and a new “Information and Technology” subject. Within this new subject, “Information Technology” will include topics such as programming for measurement and control, content and data, and the development of information technology and society. Additionally, “Production Technology Based on Information” will include materials processing, biological cultivation, energy conversion, and integrated practical activities. These reforms are intended to significantly strengthen informatics education.

### **Informatics Education in Senior High Schools**

At the upper secondary level, the content of the compulsory subject “Informatics I” is expected to be reorganized from the current structure—

1. Problem Solving in the Information Society
2. Communication and Information Design
3. Computers and Programming
4. Information and Communication Networks and Data Utilization

—into the following framework:

1. Information Systems and Their Relationship with Society
2. Information Design and Design Thinking
3. Data Analysis, Modeling, and Simulation
4. Algorithms and System Development
5. Inquiry-Based Problem-Solving Using Information and Information Technology

Similarly, the advanced subject “Informatics II” is expected to evolve from:

1. Development of the Information Society and Information Technology
2. Communication and Content
3. Information and Data Science
4. Information Systems and Programming
5. Inquiry-Based Problem Discovery and Resolution

to a more advanced structure:

1. Social Issues and Data Science
2. Content Design
3. Artificial Intelligence
4. Advanced Technologies and Information System Design
5. Creative Problem Discovery and Solution Practices

### **The Common Test for University Admissions: “Informatics I”**

#### **Examination Characteristics**

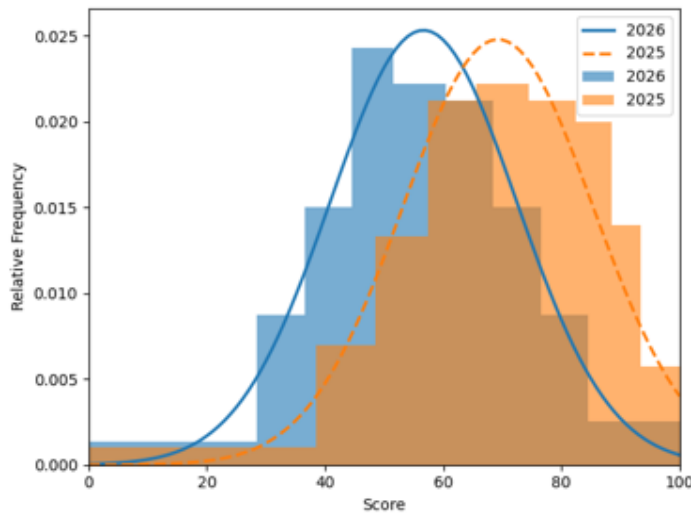
The Common Test for University Admissions subject “Informatics I,” first administered in 2025 and conducted for the second time in 2026, primarily featured questions requiring reasoning and judgment based on given scenarios rather than direct recall of isolated knowledge. For example, tasks such as estimating production workloads for cultural festival projects were presented using familiar contexts for high school students while encouraging consideration of system development processes such as requirements analysis and specification design. These questions appear to promote understanding of practical thinking processes in the informatics field.

In the programming section, a standardized pseudo-language independent of specific programming languages was used. This design helped minimize advantages or disadvantages arising from differences in learning environments or programming languages used by students.

#### **Score Trends and Examination Structure**

Approximately 300,000 students nationwide took the “Informatics I” examination. In 2025, the mean score was 69.26 out of 100 (SD = 16.09), while in 2026 the mean score declined to 56.59 (SD = 15.72) (Figure 2).

**Figure 2**  
*Stanine Distribution Chart*



In the first year, roughly 30 points' worth of questions had correct answer rates approaching 90% (Figure 3). In contrast, such relatively easy items were absent in the second year, resulting in a lower average score but improved discriminative validity as a university entrance examination.

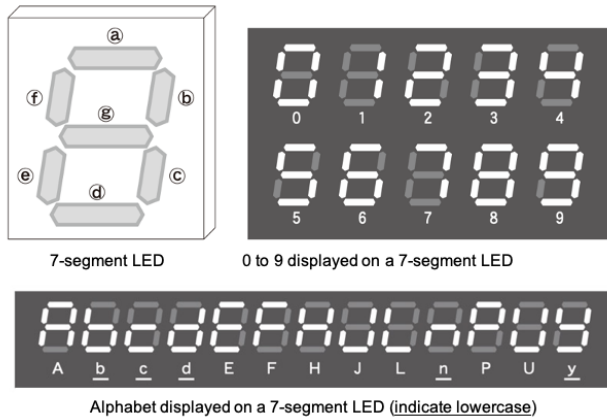
**Figure 3**  
*Correct Answer Rates by Question (2025)*



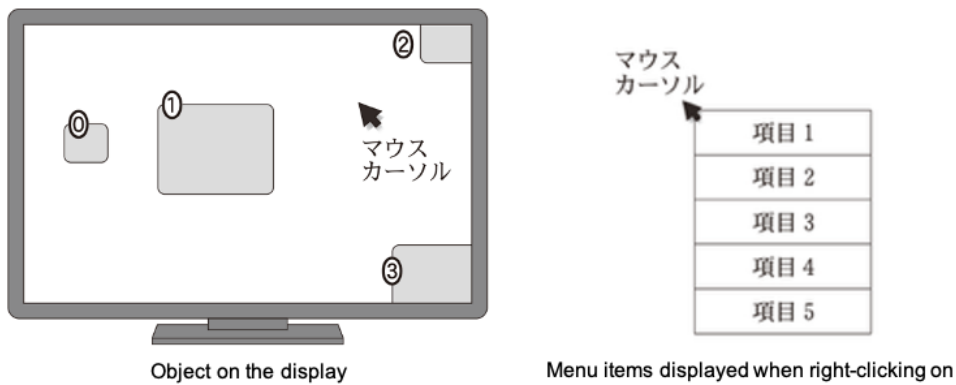
**Types of Examination Items**

Examples of examination items included tasks involving seven-segment LED display patterns and determining the number of components required to display error codes (Figure 4). Other items addressed GUI design based on Fitts' Law (Figure 5) and smartphone user interface design (Figure 6).

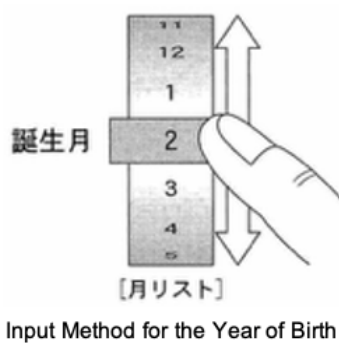
**Figure 4**  
*Problem 1, Question 2 (2025)*



**Figure 5**  
*Problem 1, Question 4 (2025)*



**Figure 6**  
*Problem 1, Question 3 (2026)*



Beyond “Informatics I,” the Common Test frequently employs long conversational texts requiring contextual interpretation (Figure 7). Questions also addressed familiar information systems, focusing on data flows and system mechanisms (Figure 8, Figure 9). Simulation-based problems were included (Figure 10), as well as logical operations using image processing contexts (Figure 11).

**Figure 7**  
*Problem 2, A (2025)*

A 高校生のYさんは、職業体験のため全国チェーンの総合スーパーマーケット [LikeWing] 駒谷商店を訪れている。レジを担当したYさんと店長の会話文を読み、後の問い(問1~4)に答えよ。

Yさん：レシートにはたくさんの情報が印字されていますね(図1)。このレシートには「ポイント会員ID」が載っていますが、ポイントカードは店側にとってどんなよいことがあるのですか？

店長：LikeWingでは、ポイントカードを作成する際に、お客様の名前、性別、生年の三つの属性情報をポイント会員情報として登録してもらっています。そして、(A)ポイント会員情報とレシートに印字されている情報を組み合わせて分析することで販売促進につなげています。

Yさん：それらの情報には大切な情報も多いですよね。どう管理されているのですか？

店長：はい、ポイント会員情報とレシートに印字されている情報は、LikeWingの本部の情報システムで一括して管理しています。(B)本部、各店舗、商品を製造するメーカー、商品を店舗に配送する配送センターの間で情報をやり取りして、商品は本部が一括して発注し、配送の指示を出します。

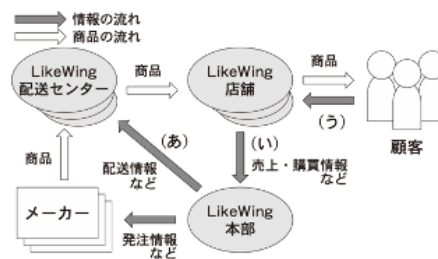
Yさん：LikeWingのネットショッピングサイトは有名ですね。そのネットショッピングサイトと、この情報システムはつながっているのですか？

店長：今まさに、連携を検討しているところです。これらが(C)連携するメリットは多くあります。

**Figure 8**  
*Problem 2, A (2025)*

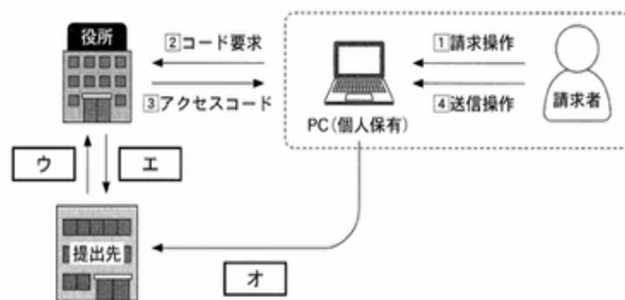


Example of a receipt



Main Information Flow and Product Flow in the System

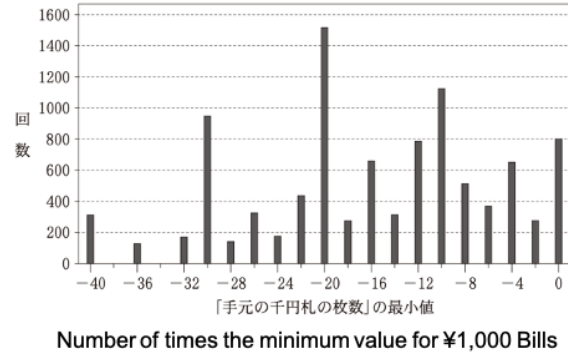
**Figure 9**  
*Problem 2, A (2026)*



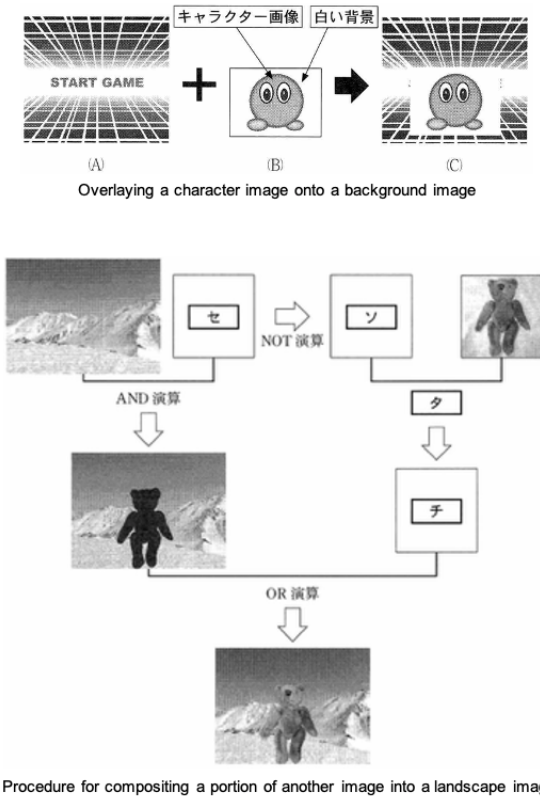
Information system that uses the access code

**Figure 10**  
 Problem 2, B (2025)

Changes in ¥10,000 and ¥1,000 Bills by Random Number  $r$

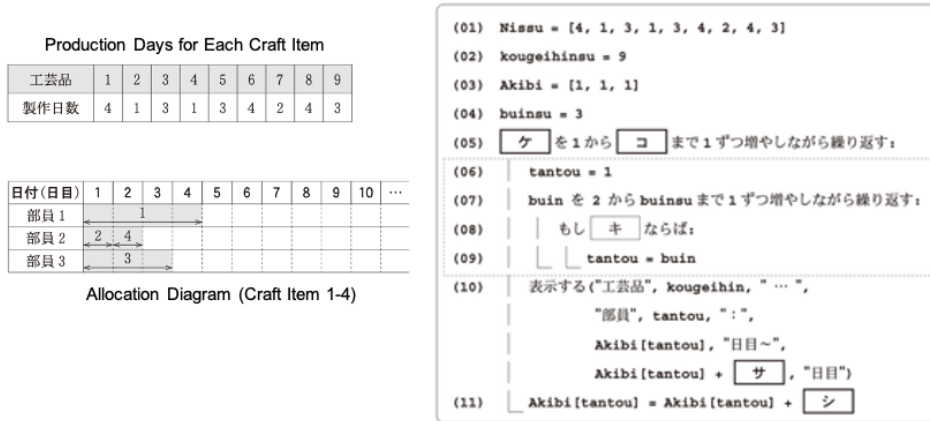


**Figure 11**  
 Problem 2, B (2026)



Programming accounted for approximately one-quarter of the examination and was presented in Japanese using a standardized pseudo-code notation resembling Python syntax (Figure 12).

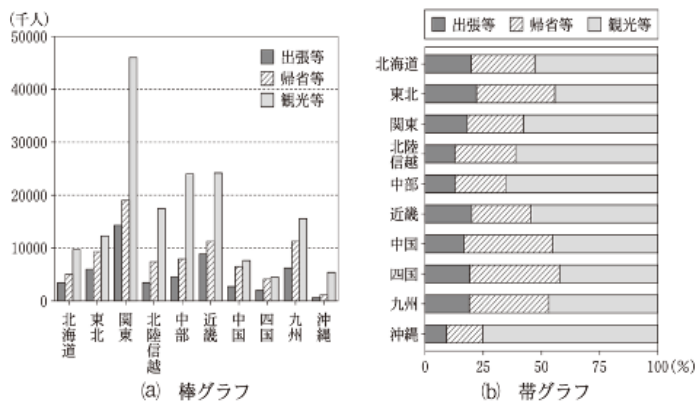
**Figure 12**  
Problem 3 (2025)



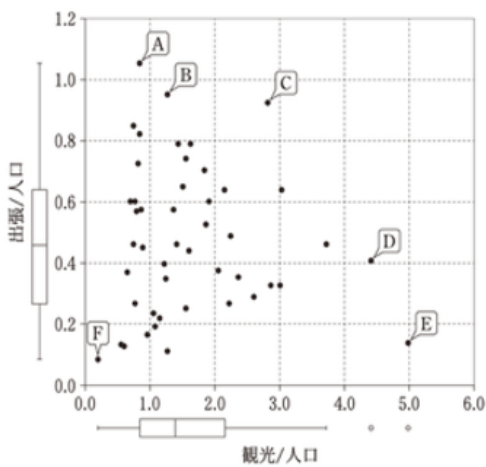
Program Displaying the List of Assignments and Periods for Each Craft Item

Data utilization also comprised about one-quarter of the exam, with a strong emphasis on graph interpretation (Figure 13, Figure 14).

**Figure 13**  
Problem 4 (2025)

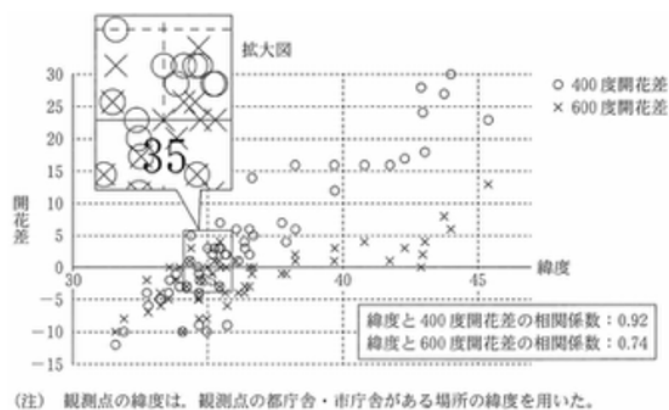


Bar chart and band chart created based on the data in



Scatter plot showing combinations of "Business Travel / Population" and "Tourism / Population"

**Figure 14**  
Problem 4 (2026)



Scatter plot of latitude and differences in flowering time

## Discussion

### Shift Toward Cross-Disciplinary Thinking

Overall, “Informatics I” appears to be a subject requiring students to integrate knowledge and reasoning across multiple academic disciplines. Previous university entrance examinations often focused on the application of previously learned knowledge and were criticized for insufficiently measuring inquiry skills and practical application abilities. In contrast, “Informatics I” demonstrates potential as a response to these criticisms.

Many questions required cross-disciplinary thinking and appeared to assess abilities associated not only with informatics but also with creative professions—namely, the ability to generate new ideas by integrating diverse forms of knowledge.

### Relevance to Contemporary Information Society

In recent years, the widespread adoption of smartphones and improvements in network infrastructure have significantly increased the volume of information encountered in daily life. Furthermore, the emergence of generative AI has made it possible to access vast amounts of information and potential solutions instantly. In such a context, the ability to evaluate, organize, and utilize information objectively—along with the ability to connect disparate ideas—is becoming increasingly important. The cross-disciplinary and applied nature of the “Informatics I” examination reflects this societal background.

Although generative AI enables individuals to create outputs more easily than ever before, producing original and innovative work requires the ability to integrate diverse perspectives and knowledge. The structure of this examination appears to reflect this growing need.

### Creativity and Practical Competence

Another notable feature is the close alignment between examination content and real-world professional practices. The questions suggest that what students learn in school is directly relevant to practical work in society, helping to bridge the gap between academic learning and real-life professional contexts.

## **Challenges and Future Issues**

### **Examination Weighting and University Utilization**

One key issue for future consideration is the weighting of “Informatics I” within university entrance examinations and how widely it is utilized. Currently, more than 60% of universities allocate less than 10% of the total entrance examination score to this subject, indicating that its status remains relatively limited. Furthermore, while approximately 90% of national universities incorporate “Informatics I” into admissions decisions, only about 45% of public universities do so. If fostering information literacy and higher-order thinking skills is a priority, the influence of such weighting and utilization practices on students’ learning behaviors should be examined further.

### **Learning Environment and Teacher Expertise**

Another challenge concerns the adequacy of the learning environment for “Informatics I.” A survey conducted by the learning application Studyplus found that only about 40% of students responded positively when asked whether they found Informatics I classes enjoyable. Reasons cited by students who responded negatively included insufficient teacher understanding, unclear explanations, and inadequate support for students struggling with the material.

From the perspective of operating a YouTube channel providing instructional content on Informatics I, feedback from learners and educators suggests that the subject is sometimes taught by teachers whose primary specialization lies outside informatics. Additionally, there appear to be considerable variations in content coverage and instructional depth among teachers. To maximize learning outcomes, improvements in teacher expertise and instructional systems, as well as enhanced learning environments within schools, are necessary.

### **Expanding Audience and Lifelong Learning**

Another observation from operating a YouTube channel focused on Informatics I concerns the demographic characteristics of viewers. The audience is not primarily composed of high school students; rather, individuals in their 40s and 50s represent the largest demographic group.

This may reflect the fact that teachers from other subject areas are seeking instructional resources or conducting lesson preparation. It also suggests that mid-career professionals interested in acquiring informatics knowledge for professional development or personal growth are drawn to the subject matter covered in Informatics I.

### **Limitations**

This study relies primarily on qualitative analysis of publicly available examination materials and score statistics. Classroom implementation, student learning outcomes, and longitudinal impacts were not empirically measured. Future research should incorporate classroom observations, teacher interviews, and student performance data.

### **Conclusion**

Japanese curriculum reforms and the introduction of Informatics I represent a major shift toward evaluating applied reasoning, cross-disciplinary thinking, and practical competencies.

The examination aligns with societal changes driven by digitalization and generative AI. However, challenges remain regarding assessment weighting, teacher training, and learning environments. Addressing these issues will be essential to fully realize the educational potential of informatics education in Japan.

### **Acknowledgements**

This work was supported by JSPS KAKENHI Grant Number JP23H00068.

### **Declaration of Generative AI and AI-Assisted Technologies in the Writing Process**

The authors declare that Grammarly, an AI-assisted writing software, was used in proofreading and refining the language used in the manuscript. The usage was limited to correcting grammatical and spelling errors and rephrasing statements for accuracy and clarity. The authors further declare that, apart from Grammarly, no other AI or AI-assisted technologies have been used to generate content in writing the manuscript. The ideas, design, procedures, findings, analyses, and discussion are originally written and derived from careful and systematic conduct of the research.

## References

- MEXT. (2018, March). The Course of Study for Senior High Schools (Japanese National Curriculum Guidelines). [https://www.mext.go.jp/content/20230120-mxt\\_kyoiku02-100002604\\_03.pdf](https://www.mext.go.jp/content/20230120-mxt_kyoiku02-100002604_03.pdf)
- MEXT Curriculum Council, I. and T. W. G. (2026, January 9). Objectives, Content, and Higher-Order Competencies in the Proposed “Information and Technology” Subject for Junior High Schools. [https://www.mext.go.jp/content/20260109-mxt\\_kyoiku01-000046695\\_\\_07.pdf](https://www.mext.go.jp/content/20260109-mxt_kyoiku01-000046695__07.pdf)
- MEXT Curriculum Council, I. and T. W. G. (2026, January 9). Objectives and Higher-Order Competencies in the Senior High School Subject “Informatics.” [https://www.mext.go.jp/content/20260109-mxt\\_kyoiku01-000046695\\_\\_08.pdf](https://www.mext.go.jp/content/20260109-mxt_kyoiku01-000046695__08.pdf)
- MEXT Curriculum Council, W. G. on L. E. S. and I. S. / I.-B. L. (2026, January 27). Structural Organization of Objectives and Content in Integrated Studies and Inquiry-Based Learning. [https://www.mext.go.jp/content/20260109-mxt\\_kyoiku01-000046695\\_\\_08.pdf](https://www.mext.go.jp/content/20260109-mxt_kyoiku01-000046695__08.pdf)
- National Center for University Entrance Examinations. (2025, June 27). Report of the Examination Item Evaluation and Analysis Committee for FY2025 (Main Examination). [https://www.dnc.ac.jp/kyotsu/hyouka/r7\\_hyouka/r7\\_hyoukahoukokusyo\\_honshiken.html](https://www.dnc.ac.jp/kyotsu/hyouka/r7_hyouka/r7_hyoukahoukokusyo_honshiken.html)

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