

RESTU Web-Based Application for Further Study Planning toward Engineering and Technical Higher Education

Bakhrudin All Habsy*, Ammi Prayoga, Budi Purwoko, Shopyan Jepri Kurniawan

Universitas Negeri Surabaya, Surabaya, Indonesia
bakhrudinhabsy@unesa.ac.id

Abstract—This study developed RESTU (Rencana Studi Lanjut), a website-based application designed to help senior secondary students plan their further education options, especially those interested in engineering and technical higher education. The research adopted the R&D process, following the model by Borg and Gall, involving needs analysis, product design and development, validation by experts, revision, usability testing, field testing, and revision. RESTU is an organized source of information concerning higher education institutions, their programs, accreditation, admission routes, official links, career opportunities, and connections between programs and occupations. It is especially important for students who consider higher-education pathways in engineering and technical fields since study program choice is strongly connected with future occupational directions. Product validation proved that the tool meets all the requirements for the content, usability, feasibility, and accuracy of the data. Also, field testing showed that there are higher further study planning scores after using the application. Therefore, the application can be used as a digital educational assistance medium in providing counseling services since it helps students obtain, compare, and organize higher education and career-related information, especially concerning engineering and technical pathways.

Keywords—career guidance, digital information service, further study planning, guidance and counselling, technical students, web-based application.

I. INTRODUCTION

Senior high school students close to their graduation period have to make crucial decisions regarding their further education options, such as the choice of engineering, technical, or other programs of higher education institutions. Decisions on selecting higher education institutions and study programs can be based on academic preferences, career perspectives, institutional information, individual capacities, and sociological aspects. Career preferences of students are determined by a great number of various personal and context-based aspects, and, thus, the necessity for adequate and structured information before educational decisions can be made (Utami, 2024).

Many higher education institutions and many study programs increase the complexity of the process. Academic features of universities, institutes, colleges, polytechnics, and academies are varied, as are admissions, curricula, and

career paths. Therefore, students have to understand those features before making decisions on further education. This aspect is especially important in the case of engineering and technical programs because students should not only compare different educational institutions and admission processes but also differences in academic programs and related careers. Selection of further study programs is impacted by many factors; hence, sufficient exploration is required (Nelissa et al., 2018).

Based on the preliminary findings from SMA Negeri 8 Surabaya, the limitations faced by the school counselors in delivering information about further education are also practical. The guidance provided to the final-year students is limited due to the priority of the school timetable toward subjects related to entry to universities. Meanwhile, counselors have to handle huge amounts of information that are constantly being updated regarding universities, programs, accreditation, entry ways, and job opportunities. This situation requires a digital information medium that students could access independently but still be connected to the school guidance and counseling service. Digital career-consultation applications can provide additional support for students in exploring study programs and organizing career-planning strategies (Budiyono & Aji, 2021).

Digital technology offers opportunities to address this need. In engineering and technical education pathways, digital information systems can help students explore complex relationships among institutions, study programs, admission requirements, and future occupations. More generally, the integration of technology into education can broaden access to information and support learning activities beyond conventional face-to-face settings (Maritsa et al., 2021). Website-based services can provide information through smartphones, laptops, and school computers without requiring users to install additional software. Digital platforms can also extend access to educational information beyond face-to-face counseling sessions. Educational technology can also help students adapt to increasingly digital learning and information environments (Alimuiddin et al., 2023). Studies on web-based applications and mobile learning literacy indicate that digital environments can broaden access to educational information and support technology-mediated learning (Artina et al., 2027;

Abdulummin & Onasanya, 2026). However, access is not enough. Students also require navigation, reliable information, and proper guidance in interpreting academic vocabulary and comparing alternative education choices. Digital literacy becomes important as students need to be able to analyze information rather than just access it. It can be facilitated through a web application that has an information access feature together with good navigation and educational content (Artina et al., 2027).

Students need clear language when they come across unfamiliar terms such as study program, accreditation, admission pathway, and occupational classifications because these kinds of words are difficult to understand at first. Students find it easier to understand technical terms if they are explained in simple ways and illustrated with clear examples (Nandiyanto & Yulistiani, 2024). This is especially important in engineering education pathways. This is because students often encounter words related to study programs, accreditation, admission routes, professional fields, and occupational classifications. In further-study planning, such clarity can help technical students interpret higher education information and compare available options more systematically.

Further Study Planning (RESTU; known as Rencana Studi Lanjut in Indonesian) was developed to respond to these needs. The application provides information about higher education institutions, faculties, study programs, accreditation, official websites, admission links, strategies for selecting institutions, and examples of career opportunities. It also connects study programs with the Klasifikasi Baku Jabatan Indonesia (KBJI), allowing students to explore relationships between educational fields and occupational categories.

Previous studies have shown that online information services and web-based career media can support students' access to educational and career information (Murti et al., 2021; Mursafira & Muslima, 2024). Research on senior high school students also indicates that students need adequate information when evaluating educational fields and future study options (Camilon et al., 2025). Nevertheless, many digital services primarily provide information without systematically connecting higher-education choices with occupational classifications or integrating the information-management role of school counselors. I see this limitation matters for engineering and technical education pathways because students can benefit from seeing links between academic programs and future job directions.

I found that this study aimed to create and test the RESTU web-based application as a tool to help senior secondary students receive information about continuing their studies. The focus was on helping students plan their paths toward engineering and other technical areas of education. The study examined how acceptable the application was by gathering feedback from experts and from students who used the application. The study also examined how students' plans for continuing their studies changed after students used the application. RESTU is

viewed as a tool that helps students obtain access to structured information about education and jobs. RESTU also ensures that school counselors continue to play their role in helping students make decisions. From the perspective of engineering education, the application offers a way to link students' choices about education with possible job paths. The application offers information on study programs, connecting study programs with real-life career opportunities.

II. LITERATURE REVIEW

A. Further Study Planning toward Engineering and Technical Higher Education

Further study planning involves identifying educational opportunities, evaluating personal interests and abilities, and considering academic, financial, family, and career factors before selecting a higher education pathway. This process is particularly relevant during the senior-secondary stage, when students increasingly explore identity, independence, and future educational directions (Addzaky, 2024). Technical students may face difficulty when many study programs appear similar or when information about curriculum, accreditation, admission requirements, and career prospects is fragmented across different sources (Nelissa et al., 2018; Ramadhani et al., 2026).

Effective planning therefore requires both self-understanding and access to reliable environmental information. Self-efficacy and family support are associated with students' career maturity, indicating that further-study planning involves both individual and social factors (Lutfianawati & Widyayanti, 2019). For students considering engineering and technical higher-education pathways, structured information can help reduce decisions based solely on peer influence, familiarity with nearby institutions, or incomplete knowledge of study programs and occupational directions. Career and educational guidance can support this process by helping students connect personal characteristics with available educational and occupational opportunities. Exploration of students' interests and aptitudes can provide useful information for identifying educational directions that correspond more closely with their individual characteristics (Rostiana & Saraswati, 2018). Digital media may extend these services beyond scheduled counseling sessions by allowing students to explore information independently before discussing their choices with school counselors.

B. Digital Information Services for Further Study Planning

Website-based applications provide flexible access to information through smartphones, laptops, and school computers. For engineering and technical education planning, such systems can also organize information that is otherwise distributed across institutional websites, accreditation sources, admission portals, and occupational references. Unlike conventional printed materials, web-based systems can organize large amounts of information and allow administrators to update content when institutional

data change. Studies on digital educational environments indicate that web-based applications can support information access and digital literacy when navigation and content are designed around users' needs (Artina et al., 2027). Mobile and digital learning initiatives can also extend access to educational information outside conventional classroom settings (Abdulummin & Onasanya, 2026). However, accessibility involves more than technical availability. Students must be able to understand the information presented, locate relevant content, and distinguish reliable information from less credible sources. Clear academic terminology is especially important when students encounter unfamiliar terms such as accreditation, admission pathway, study program, and occupational classification. Specialized jargon can be made accessible for students with relatable explanations (Nandiyanto & Yulistiani, 2024).

C. Guidance, Career Information, and the Role of RESTU

Digital guidance media should be used as a supplement to the function of school counselors. Students can search for information about universities independently. But counselors remain critical in assisting them to interpret their choices, manage the confusion, and match their educational choices with their interests, skills, and family needs. Online information services can assist students in obtaining information about higher education and stimulate their interest to study more (Murti et al., 2021). Web-based career information tools can also help students in learning about education and career paths systematically (Mursafira & Muslima, 2024). RESTU was developed based on these ideas. The application collects data about educational institutions, departments, study programs, accreditation, admission websites, and job opportunities. It also links study programs with the Klasifikasi Baku Jabatan Indonesia (KBJI), offering a path from education choices to possible jobs. The relationship between students' needs and the main RESTU features is presented in Table I.

TABLE I
RELATIONSHIP BETWEEN TECHNICAL STUDENTS' NEEDS AND RESTU FEATURES.

Student Need	RESTU Feature	Intended Benefit
Identifying higher education institutions	Higher education institution list	Students can compare institutional options
Identifying study programs	Faculty and study program lists	Students can explore available academic fields
Understanding career opportunities	Study program–KBJI mapping	Students can connect study programs with occupational directions
Preparing for admission	Official admission links	Students can access official institutional sources
Using the application independently	User guide	Students can follow the exploration process independently
Accessing updated information	Counselor admin page	School counselors can update institutional information

III. METHOD

A. Research Design and Development Procedure

This study used a research and development method to create and check the RESTU website-based application. Research and development is a choice when a study includes building a product step by step, checking it, changing it, and testing it before it is used more widely (Waruwu, 2024). The Borg and Gall model was changed into a process that includes looking at needs, making a plan, creating a version of the product, getting experts to check it, making changes, testing it with users trying it in real situations, making final changes, and sharing it with others. The study took place at SMA Negeri 8 Surabaya. Early talks with school counselors and students helped find problems with information, about study and decide what information the application should have. The development stages are summarized in Table II.

TABLE II
DEVELOPMENT STAGES OF THE RESTU APPLICATION.

Stage	Main Activity	Output
1	Needs analysis through interviews and literature review	Student and counselor needs
2	Planning objectives, content, structure, and application flow	RESTU design
3	Developing the preliminary website	Application prototype
4	Material and media expert validation	Validation scores and revision notes
5	Revising the preliminary product	Revised product
6	User testing by school counselors	User acceptability data
7	Operational revision	Field-test version
8	Field testing with technical students	Pretest and posttest data
9	Final revision	Final RESTU application
10	Dissemination	Research and publication outputs

B. Participants and Product Validation

One guidance and counseling material expert and one media expert evaluated the application. The guidance and counseling material expert checked content accuracy, completeness, and language. They checked whether it met students' needs. The media expert looked at interface quality, navigation, usability, and how well it matched the service objectives. Three school counselors took part in the user-testing stage. They evaluated the application in terms of utility, how it was implemented, and its accuracy. Their comments, in words, were also used to improve the information content, navigation, and how easy the application was to use. The final field test involved 68 students from two classes who expressed interest in continuing to higher education. The students completed a further-study planning questionnaire before and after using RESTU.

C. Instruments

Data were collected using semi-structured interview guidelines, expert and user validation questionnaires, and a further-study planning questionnaire. The validation instruments assessed utility, feasibility, and accuracy. The

initial further-study planning instrument consisted of 26 items. Validity testing retained 23 items, while three items were excluded. The final instrument showed high internal consistency, with a Cronbach's alpha of 0.971.

D. Data Analysis

Expert and user validation scores were converted into percentages and interpreted using predetermined acceptability categories. Qualitative comments from experts and school counselors were used to guide product revision. Pretest and posttest scores were analyzed using descriptive statistics. Normality was assessed using the Kolmogorov–Smirnov test because the field test involved more than 50 participants. Since the posttest data were not normally distributed, differences between pretest and posttest scores were analyzed using the Wilcoxon Signed-Rank Test. Because the field test used a one-group pretest–posttest design without a comparison group, the analysis was used to examine changes after RESTU use rather than establish a definitive causal effect.

IV. RESULTS AND DISCUSSION

A. Development of the RESTU Application

The needs analysis showed that students required structured and easily accessible information to support further-study planning. This requirement is also relevant to students considering engineering and technical higher-education pathways, where institutional, academic, admission, and occupational information must often be compared simultaneously. The main information needs included higher education institutions, faculties, study programs, accreditation, admission pathways, and career opportunities. School counselors also required a medium that could organize this information and remain accessible outside limited face-to-face counseling sessions.

RESTU was developed as a web-based information service. The application provides information on higher education institutions, faculties, study programs, accreditation, official websites, admission links, and career opportunities. Study programs are also connected with occupational information based on the Klasifikasi Baku Jabatan Indonesia (KBJI), allowing students to explore possible relationships between educational choices and occupational directions.

The application was designed with separate functions for students and school counselors. Students can independently explore further-study information, including information relevant to engineering and technical study pathways, whereas counselors can manage and update information through the administrative interface. Students can browse study information independently. Counselors can manage and update study information through the administrative interface. In this arrangement, RESTU is a support tool for guidance services, not a substitute for counseling.

B. Expert Validation and User Testing

RESTU was evaluated by a material expert, a media expert, and three school counselors on acceptability based on

the utility, implementation, and accuracy (see Table III). RESTU meets the required standards of acceptability. Feedback was taken from the experts and users on the completeness of information, navigation, terminology, accessibility, and the frequency of updating data, and this feedback was used to improve the application.

We compared the pretest and posttest scores of 68 students (see Table IV) to test the effect of RESTU on further-study planning. The average score for further-study planning increased with the use of RESTU, and the lowest score was significantly improved.

The positive user feedback shows that RESTU can be used in school guidance services as a source of information, where Digital educational tools can help students access information beyond face-to-face learning, especially when the technology is easy to access and meets what users need (Artina et al., 2027; Abdulmumin & Onasanya, 2026). But school counselors still play a role. This is because the availability of information does not mean students will make educational choices, and Counselor support remains critical.

TABLE III
RESULTS OF RESTU ACCEPTABILITY ASSESSMENTS.

Assessor	Utility	Implementation	Accuracy	Mean
Material expert	80.00%	85.00%	85.00%	83.33%
Media expert	90.00%	95.00%	90.00%	91.66%
User 1	91.66%	90.00%	90.00%	90.55%
User 2	87.50%	95.00%	90.00%	90.83%
User 3	91.66%	90.00%	85.00%	88.86%
Mean by users	–	–	–	90.08%

TABLE IV
SUMMARY OF PRETEST AND POSTTEST SCORES.

Test	N	Mean	Minimum	Maximum
Pretest	68	69.38	45	98
Posttest	68	77.17	63	92

C. Changes in Further-Study Planning

In the field test, 68 technical students participated in the further-study planning questionnaire before and after using RESTU. Descriptive results showed higher posttest scores than pretest scores.

In addition to the mean-score change, the distribution of technical students across the low, moderate, and high categories was examined, as presented in Table V. No technical student remained in the low category after using RESTU, while the number in the high category increased from 19 to 34. This shift indicates improvement in the distribution of further-study planning scores.

Before testing the difference between the two measurements, data normality was examined. Because the posttest scores did not meet the normality assumption, the pretest–posttest difference was analyzed using the Wilcoxon Signed-Rank Test.

TABLE V
CATEGORICAL CHANGES IN FURTHER-STUDY PLANNING.

Category	Score Range	Pretest	Posttest
Low	< 60.38	6 students	0 students
Moderate	60.38–78.38	43 students	34 students
High	> 78.38	19 students	34 students

Table VI shows a statistically significant difference between the pretest and posttest scores, indicating an improvement in further-study planning following RESTU use. However, because the study used a one-group pretest–posttest design without a comparison group, the result does not establish that RESTU alone caused the improvement. The improvement can be understood from the information structure provided by the application. Online information services help students to find education and career information with more ease. Searching in many different places, students would be able to look at schools, study programs, accreditation, admission information, and job chances all in one organized space (Murti et al., 2021; Mursafira & Muslima, 2024).

TABLE VI
STATISTICAL TEST SUMMARY.

Statistical Test	Data	Value	Interpretation
Kolmogorov–Smirnov	Pretest	0.060	Normal
Kolmogorov–Smirnov	Posttest	< 0.05	Non-normal
Wilcoxon	Pretest–	<	Significant
Signed-Rank Test	posttest	0.001	difference

The connection between study programs and job categories is relevant. This is because planning for education is not only about selecting where to study but also how education choices can lead to future jobs. Students may have ideas about studying in science and technology fields compared to other fields. This shows the importance of providing them with information when they are looking at school options (Camilon et al., 2025). Students get information about education and jobs. They can think about their choices in a more structured and meaningful way.

Another important factor is the clarity of the information. Students need to know what is meant by approved study programs, admission requirements, and job categories. This is for them to be able to truly utilize the information. Using language can help students understand better by connecting new words with things they already know (Nandiyanto & Yulistiani, 2024). The usefulness of RESTU is not about how much information is available. It also depends on how that information is presented and explained.

From an engineering education point of view, RESTU shows how a digital system can help students plan their career paths. This is by connecting information about study programs with job classifications. This is especially helpful for students considering engineering and technical higher education. These choices are not just about choosing a school but also require understanding how academic subjects relate to real-world careers and future jobs. The goal of RESTU is not to replace counseling, but rather to organize information about education. In a clear digital format, this helps students explore their options fully and make better decisions.

The findings of the field test should be interpreted with caution. As the study used a one-group pretest–posttest design, there was no comparison group and no random assignment. For this reason, we cannot say that any

improvements seen were due to RESTU. Other factors could have been involved. For example, students might have already known some information. They could have received guidance at the time. Repeated testing might have changed their answers. Also, they might have learned things outside the study, where all factors could explain the change in results. RESTU leads to improvement. They do not prove that RESTU directly causes better outcomes.

RESTU is a web-based tool for further research information. It can help students organize details concerning education and job opportunities. We know that its best use is to support school counseling, and it gives students independence in terms of finding structured information. This is, indeed, the case; it does not replace counselors. Counselors remain essential, as they assist learners in comprehending what the options mean and guide them toward choices that suit their goals.

CONCLUSION

This study developed RESTU as a web-based application to support senior secondary students in planning further study, including pathways toward engineering and technical higher education. Expert and user assessments indicated that RESTU was acceptable in terms of utility, implementation, and accuracy. The field test also showed an improvement in further-study planning after students used the application, including a shift from lower to higher planning categories. RESTU provides structured information on higher education institutions, study programs, admission pathways, accreditation, and occupational opportunities through the Klasifikasi Baku Jabatan Indonesia (KBJI). The application can therefore support school counseling by expanding students’ independent access to educational and career information while maintaining the counselor’s role in guiding decision-making. From an engineering education perspective, RESTU provides a digital pathway-planning mechanism that connects higher-education programs with occupational information and can support students who are exploring engineering and technical study directions. However, the findings should be interpreted within the one-group pretest–posttest design and the application’s initial geographic and information scope.

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REFERENCES

Abdulummin, I. A., & Onasanya, S. A. (2026). Empowering students and communities through mobile learning literacy: A community service initiative. *ASEAN Journal of Community Service and Education*, 5(1), 51–60.

Addzaky, K. U. (2024). Perkembangan peserta didik SMA (Sekolah Menengah Atas). *Jurnal Ilmiah Nusantara*, 1(3), 75–85.

- Alimuddin, A., Juntak, J. N. S., Jusnita, R. A. E., Murniawaty, I., & Wono, H. Y. (2023). Teknologi dalam pendidikan: Membantu siswa beradaptasi dengan Revolusi Industri 4.0. *Journal of Education*, 5(4), 36–38.
- Artina, F., Amin, M., Bribin, M. L., & Handayani, N. (2027). Digital literacy through a web-based application: Addressing polarization and promoting social integration among Islamic senior high school students. *ASEAN Journal of Educational Research and Technology*, 6(1), 51–66.
- Budiyono, N. R., & Aji, A. S. (2021). Aplikasi konsultasi karier untuk memilih jurusan dan strategi perencanaan karir. *Jurnal Penelitian Bimbingan Dan Konseling*, 6(2).
- Camilon, K. F., Dupitas, J. E. A., Cajandig, A. M. C., Cuba, B. A. A., Valdez, A. G., Abelito, J. T., & Marcella, A. M. A. (2025). Perceptions of senior high school science, technology, engineering, and mathematics (STEM) students toward STEM and non-STEM courses: A comparative qualitative study. *ASEAN Journal for Science Education*, 4(2), 105–112.
- Lutfianawati, D., & Widyayanti, N. (2019). Hubungan antara efikasi diri dan dukungan sosial keluarga dengan kematangan karir siswa kelas XII SMK “X” Kabupaten Waykanan. *Psyche: Jurnal Psikologi*, 1(1), 37–44.
- Maritsa, A., Salsabila, U. H., Wafiq, M., Anindya, P. R., & Ma’shum, M. A. (2021). Pengaruh teknologi dalam dunia pendidikan. *Al-Mutharahah; Jurnal Penelitian dan Kajian Sosial Keagamaan*, 18(2), 91–100.
- Mursafira, Y., & Muslima. (2024). Pengembangan media layanan informasi berbasis web untuk pemahaman karir siswa. *Guidance*, 21(1), 1–11.
- Murti, C. G., Maynawati, A. F. R. N., & Edmawati, M. D. (2021). Pengaruh layanan informasi melalui daring terhadap peningkatan minat studi lanjut ke perguruan tinggi pada siswa SMAN 3 Sukoharjo. *Jurnal BK Pendidikan Islam*, 2(2), 100–113.
- Nandiyanto, A. B. D., & Yulistiani, F. (2024). How technical language supports students’ understanding in engineering education: Definitions and step-by-step interpretation of dimensionless parameters (Re, Pr, Pe, Nu, Gr, Ra, Bi, and Fo) in heat transfer. *International Journal of Language Education*, 8(4), 885–900.
- Nelissa, Z., Astuti, S., & Martunis, M. (2018). Identifikasi faktor yang memengaruhi siswa dalam proses pemilihan jurusan pendidikan lanjutan. *JPPI: Jurnal Penelitian Pendidikan Indonesia*, 4(1), 78–83.
- Ramadhani, F., Nita, R. W., & Mulyani, R. R. (2026). Eksplorasi faktor yang mempengaruhi peserta didik dalam mengambil keputusan pemilihan studi lanjut (studi pada peserta didik kelas XI di SMAN 15 Padang). *FOKUS: Kajian Bimbingan dan Konseling dalam Pendidikan*, 9(1), 19–32.
- Rostiana, R., & Saraswati, K. D. H. (2018). Penelusuran minat-bakat untuk siswa SMA di Yogyakarta. *Jurnal Bakti Masyarakat Indonesia*, 1(1).
- Utami, T. R. (2024). Analisis faktor-faktor yang mempengaruhi pilihan karir siswa: Pendekatan kualitatif dalam konteks pendidikan menengah atas. *Educatus: Jurnal Pendidikan*, 2(2), 34–40.
- Waruwu, M. (2024). Metode penelitian dan pengembangan (R&D): Konsep, jenis, tahapan dan kelebihan. *Jurnal Ilmiah Profesi Pendidikan*, 9(2), 1220–1230.