Technology Transfer of Face Recognition Attendance System to Strengthen Community Management for People with Disabilities

R.C. Tan[1*], N. Yusof[1] and S. Hussin[2]

[1]Politeknik Balik Pulau,
11000 Balik Pulau, Penang, Malaysia

[2]Politeknik Tuanku Sultanah Bahiyah,
09000 Kulim, Kedah, Malaysia

*Corresponding Author's Email: rhuchoon@pbu.edu.my
Article History: Received 15 January 2025; Revised 27 February 2025;
Accepted 13 March 2025

Abstract
Technology transfer to the community may improve social and economic development in an area while also hastening the process of technology adoption and use. As a result, the Pusat Pemulihan Dalam Komuniti (PPDK) Air Putih in Balik Pulau, Penang, has received the technology transfer project namely "An Advanced Face Recognition Technology" (i-FRAS 2.0) from Politeknik Balik Pulau (PBU). PPDK is a training and rehabilitation centre for children with the status Persons with Disabilities (OKU), which is supervised by the Jabatan Kebajikan Masyarakat (JKM). The problem faced is that PPDK officers record the attendance of OKU trainees in a conventional way, which is to write records in a logbook. This attendance record is also reported manually to the JKM officer for monthly allowance payment to each trainee. Attendance recording and generating reports like this is quite time-consuming, and PPDK officers have limited staff. Therefore, this study investigates the effectiveness of face recognition technology to record the attendance of OKU trainees and to identify the feedback from PPDK management of this technology transfer project. Ten PPDK staff who utilised this system were provided with User Experience Questionnaires (UEQ). An interview was also carried out with PPDK's supervisor regarding the technology transfer of i-FRAS 2.0. The findings of the study show that the task of recording the attendance of trainees is time-saving. The transfer of face recognition technology through the i-FRAS 2.0 system was well organised, increased productivity, and eased the management of PPDK trainees. Future studies can examine the effectiveness of improved face recognition systems using the Raspberry Pi microprocessor.

Keywords: Attendance System; People with Disabilities; Face Recognition Technologies; Technology Transfer; User Experience

1.0 Introduction
Technology transfer involves the skills and processes of products and services that can be applied according to the needs and problems of industries, agencies, and communities. It is part of the research and development innovation chain ecosystem towards the transfer of technology products and services at the Jabatan Pendidikan Politeknik dan Kolej Komuniti (JPPKK). The results of technology transfer can yield returns either in terms of commercial return on investment (ROI) or return on value (ROV) through social innovation. This community technology transfer project falls into the category of ROV Social Innovation. Direct technology transfer to the

community can expedite the adaptation and implementation process, which in turn can enhance social and economic development in the area. Hence, i-FRAS 2.0 has been selected by Politeknik Balik Pulau (PBU) for the pilot technology transfer project through several discussions with the Pusat Penyelidikan dan Inovasi (PPI), JPPKK. i-FRAS 2.0 is a real-time facial recognition attendance system developed using ESP32-CAM. Attendance records are then stored, and daily attendance reports are automatically generated and sent via email to relevant parties. The selected agency is the PPDK in Air Putih, located at Balik Pulau, Penang, Malaysia. PPDK is a rehabilitation centre for the disabled operating within a local community. 69 special children were sent to PPDK Air Putih (referred to as 'trainees'). Their trainers referred to as 'staff'. The individual coordinating the operation of a PPDK is called a supervisor. At PPDK, trainees are taught to manage themselves according to their abilities. Once the trainee has mastered suitable basic skills, they can continue their education at nearby special education schools.

The development of i-FRAS 2.0 leverages the Rapid Application Development (RAD) model, a software development approach that focuses on quick iterations and flexible design, making it well-suited for systems requiring frequent updates and rapid prototyping. In the context of using face recognition for attendance systems, RAD is beneficial as it allows for iterative development, rapid feedback, and continuous improvement from end-users, such as the students and staff involved. This approach not only enables faster implementation but also ensures that the system evolves based on real-time feedback, aligning with user requirements (Kuwar et al., 2025; Lynch, 2024). The integration of face recognition technology in educational settings, particularly for individuals with intellectual disabilities, has been explored in recent studies, demonstrating its effectiveness in various domains, including security and access managemen Consequently, the primary goal of this research is to determine user experience feedback following the deployment of i-FRAS 2.0 for trainee attendance recording. The second goal of this study is to find management's opinions regarding the technology transfer initiative. These studies highlight the importance of balancing technological innovation with user-centric design and regulatory frameworks to ensure that systems like i-FRAS 2.0 can be deployed effectively in diverse field contexts (Kopalidis et al., 2024; Lynch, 2024).

2.0 Methodology

Two methods were applied in this study, quantitative and qualitative methods. One of the methods to measure the user experience is the User Experience Questionnaire (UEQ). UEQ is a set of questionnaires that have been developed by Schrepp et al. (2014). User experience (UX) is the form of users that interact with an organisation's products or services (Hashim et al., 2022; Yusof et al., 2022). The scales of the questionnaire cover a comprehensive impression of user experience. There are six measurement variables, namely attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty, in the questionnaire. The UEQ scale can be categorised into three categories: attractiveness, pragmatic quality

(perspicuity, efficiency, dependability), and hedonic quality (stimulation, novelty) (Schrepp et al., 2014). The UEQ questionnaire has separate constructs for user experience, namely hedonic quality and pragmatic quality. Attractiveness represents a general attitude as a self-contained quality factor that has a relatively high mean score compared to other categories. Pragmatic quality describes aspects of quality related to a task, while hedonic quality is an aspect of quality that is not related to a task. The total population for this study is ten (10) PPDK Air Putih officers. The study used the "census method," the statistical enumeration method whereby each population member is studied (Bernardini et al., 2024). Thus, the sample of this study is ten officers, and the questionnaire was distributed to them. This method coincides with this study, in which the researcher needs data from all staff that use the i-FRAS 2.0, and it provides adequate information about the whole population.

The PPDK Air Putih management officer was surveyed using Technology Transfer Product Effectiveness Interview Questions as part of a qualitative technique to get feedback. The JPPKK-created interview questions are intended to evaluate the success of technology transfer products that have been applied to communities or other organisations. The interview questions are separated into sections related to finance, governance, productivity, and intellectual property management. There was just one interviewee selected since PPDK Air Putih's supervisory management is the only one who needs to provide input. The interview protocol aims to collect data from the PPDK Air Putih officers to analyse their feedback regarding the use of the i-FRAS 2.0. This study adopted the Interview Protocol Refinement (IPR) Framework from the Shoozan and Mohamad (2024) study. The IPR Framework's phases are:

i. Phase 1: Interview questions must align with research questions.
   The interview questions were created by the researchers and matched the predetermined research questions. The results of this phase were recorded.
ii. Phase 2: Constructing an inquiry-based conversation
   Interview questions were rephrased so that the conversation with the interviewee achieved the interview objectives.
iii. Phase 3: Interview session
   The interview session only involved the PPDK supervisor to get her feedback based on a checklist.

3.0 Results and Discussion

3.1 Quantitative Findings with UEQ Measurement

The average value obtained from the questionnaire data was converted to mean and variance data using the UEQ analysis tool to describe the respondents' answers. The calculation of the average value is divided into three parts, namely the average value based on each item, the average value based on each variable item, and the average value based on attractiveness, pragmatic, and hedonic qualities. The average evaluation scale is illustrated in Table 1 as follows:

Table 1: Average evaluation scale based on UEQ questionnaire (Aulia 2024; Khoirunnisa & Sondari, 2024)

Model	Description	Color Interpretation
> 0.8	Positive evaluation	Green
-0.8 to 0.8	Neutral evaluation	Yellow
< -0.8	Negative evaluation	Red

3.2 Distribution of Respondents' Feedback

This study aims to analyse user experience using i-FRAS 2.0 through the User Experience Questionnaire (UEQ). As mentioned earlier, user experience relates to the perception and reaction of real-world users to products and services (Yusof et al., 2024; Yusof et al., 2022). Thus, the research data collected from the questionnaire was processed and analysed using the UEQ data analysis tool (Schrepp et al., 2014). Based on Figure 1, the results of the analysis obtained show an overview of the level of user experience of i-FRAS 2.0 technology based on six variables, namely; attractiveness, perspicuity, efficiency, dependability, stimulation, and novelty. The distribution of users' feedback shows the user has a positive experience while interacting with i-FRAS 2.0. The green colour indicates a positive evaluation of the mean result. Thus, this finding shows that users can use this technology positively (Yusof et al., 2022).

Item	Mean	Variance	Std. Dev.	No.	Left	Right	Scale
1	0.4	0.5	0.7	10	annoying	enjoyable	Attractiveness
2	1.2	0.6	0.8	10	not understandable	understandable	Perspicuity
3	2.1	1.0	1.0	10	creative	dull	Novelty
4	1.6	0.3	0.5	10	easy to learn	difficult to learn	Perspicuity
5	0.5	0.3	0.5	10	valuable	inferior	Stimulation
6	0.8	1.3	1.1	10	boring	exciting	Stimulation
7	1.8	0.4	0.6	10	not interesting	interesting	Stimulation
8	1.7	0.5	0.7	10	unpredictable	predictable	Dependability
9	2.0	0.4	0.7	10	fast	slow	Efficiency
10	2.4	0.3	0.5	10	inventive	conventional	Novelty
11	0.0	0.4	0.7	10	obstructive	supportive	Dependability
12	0.6	0.3	0.5	10	good	bad	Attractiveness
13	-0.3	0.2	0.5	10	complicated	easy	Perspicuity
14	1.4	0.3	0.5	10	unlikable	pleasing	Attractiveness
15	2.1	0.5	0.7	10	usual	leading edge	Novelty
16	0.0	0.7	0.8	10	unpleasant	pleasant	Attractiveness
17	1.7	0.7	0.8	10	secure	not secure	Dependability
18	0.2	0.4	0.6	10	motivating	demotivating	Stimulation
19	2.6	0.3	0.5	10	meets expectations	does not meet expectations	Dependability
20	1.6	0.5	0.7	10	inefficient	efficient	Efficiency
21	1.5	0.5	0.7	10	clear	confusing	Perspicuity
22	2.4	0.3	0.5	10	impractical	practical	Efficiency
23	0.4	0.5	0.7	10	organized	cluttered	Efficiency
24	1.6	0.3	0.5	10	attractive	unattractive	Attractiveness
25	1.6	0.3	0.5	10	friendly	unfriendly	Attractiveness
26	2.3	0.7	0.8	10	conservative	innovative	Novelty

Figure 1: Distribution of users' feedback

Meanwhile, based on Figure 2, the measured items show that users of i-FRAS 2.0 have a positive user experience because the mean value range analysed is close to +3 (positive). The scale range analysed using the UEQ data analysis tool is between -3 (very bad) and +3 (very good) (Schrepp et al., 2014). Khoirunnisa and Sondari (2024) studied the level of user experience related

to the Halo Hermina application, also using the UEQ questionnaire and the range of scales developed by Schrepp et al. (2014). However, some items show the user's experience is negative (-0.3), which is the item related to "complicating/easy". This shows that users of i-FRAS 2.0 feel quite difficult while using i-FRAS 2.0. This situation may be due to the respondent having to ensure that the file related to facial recognition technology is opened first in the computer before the user can perform facial recognition to record attendance.

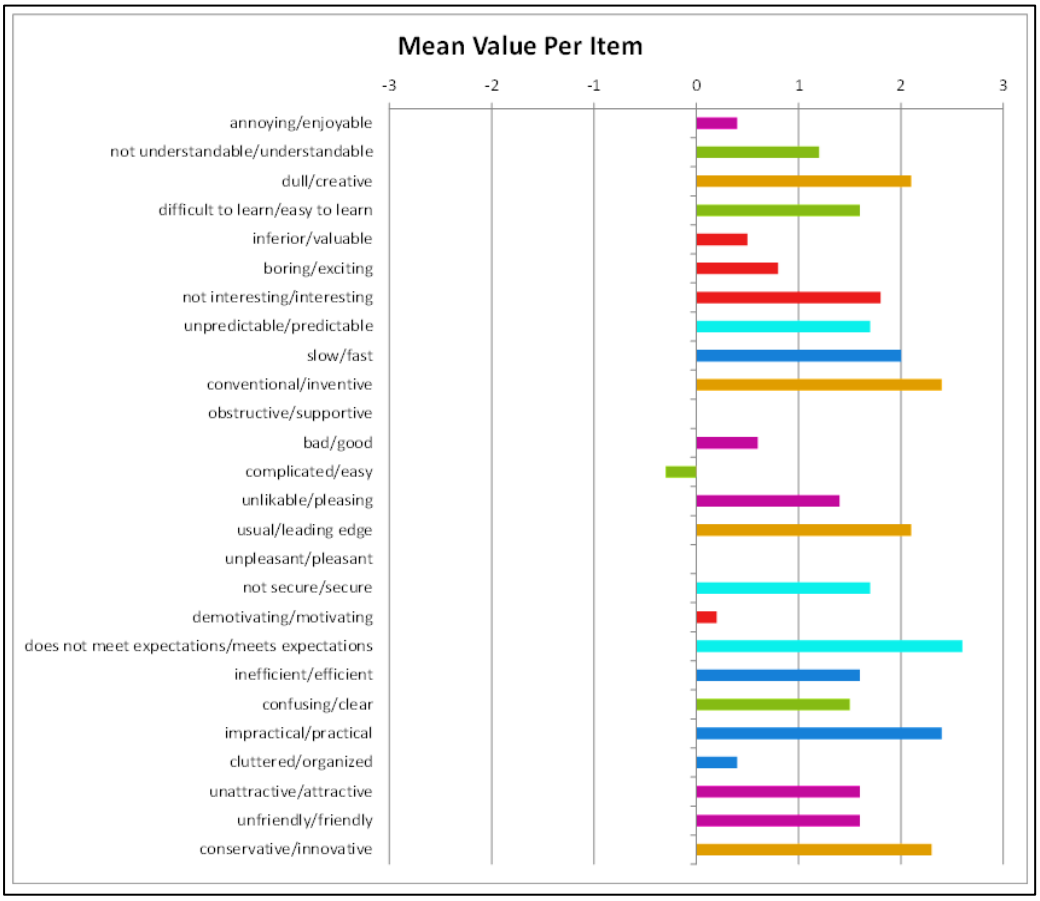

Figure 2: Mean value per item of questionnaire

3.3 Evaluation of User Experience Using UEQ Questionnaire

Based on Table 2, the level of user experience using i-FRAS 2.0 technology is positive. The value for the use of i-FRAS 2.0 technology is 0.933 for attractiveness, 1.000 for perspicuity, 1.600 for efficiency, 1.500 for dependability, 0.825 for stimulation, and 2.225 for novelty. The UEQ scale indicates that a score greater than 0.8 represents the user experience is positive. If the score is less than -0.8, it means that the user experience is negative (Aulia, 2024; Khoirunnisa & Sondari, 2024). Therefore, the results of the analysis show that users of i-FRAS 2.0 have a positive user experience on all scales. The finding is in line with the study by Giyai et al. (2024), which has a positive evaluation in terms of attractiveness, perspicuity, efficiency, dependability, and stimulation by the users. Figure 3 shows the measurement graph of six UEQ variables.

Table 2: UEQ scale (mean and variance)

UEQ Scales (Mean and Variance)		
Attractiveness	↑ 0.933	0.12
Perspicuity	↑ 1.000	0.06
Efficiency	↑ 1.600	0.07
Dependability	↑ 1.500	0.14
Stimulation	↑ 0.825	0.04
Novelty	↑ 2.225	0.09

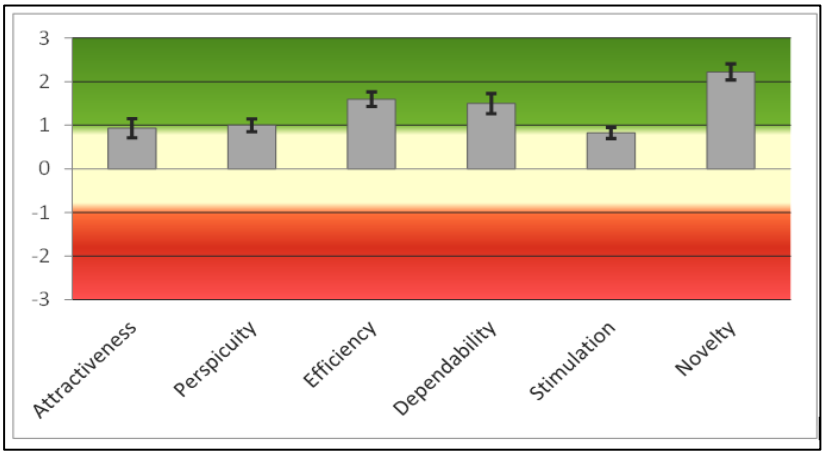

Figure 3: Measurement graph for six variables of UEQ

Based on Table 3, the measurement in terms of attractiveness is 0.93. The measurement in terms of pragmatic quality (useful quality) is 1.37, and hedonic quality (pleasure quality) is 1.53. This shows that the respondents believe that i-FRAS 2.0 is attractive. The findings of the study also show that the hedonic quality for the respondents is high and at the same time prove that the respondents feel comfortable using i-FRAS 2.0. Pragmatic quality also shows that the respondents consider the i-FRAS 2.0 technology to be clear and efficient. Moreover, the dependence on the technology is acceptable. The finding is similar to the finding from Khoirunnisa and Sondari's (2024) study, which found there is a positive user experience after the users use the product for some time. Figure 4 shows the measurement graph for pragmatic and hedonic quality.

Table 3: Mean and variance for pragmatic and hedonic quality

Pragmatic and Hedonic Quality	
Attractiveness	0.93
Pragmatic Quality	1.37
Hedonic Quality	1.53

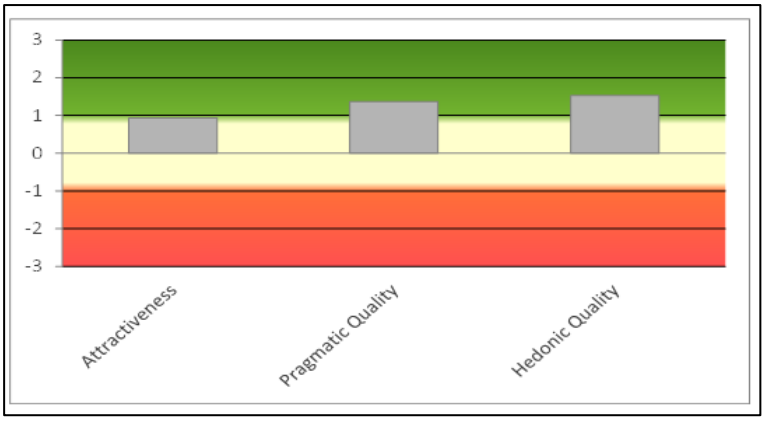

Figure 4: Measurement graph for attractiveness, pragmatic, and hedonic quality

3.4 Findings of Benchmark

Schrepp et al. (2014) have carried out a study related to user experience to obtain a more accurate understanding of product quality by comparing user experience with the results of using well-known products. Therefore, the UEQ questionnaire has been developed so that the measurement of user experience can be implemented (Amran et al., 2024). The findings of the study through the UEQ data analysis tool show that the novelty variable is excellent (Table 4). This shows that users consider i-FRAS 2.0 technology to have new features nowadays.

The findings also show that efficiency and dependability variables are good. Users of i-FRAS feel that the technology used is clear and they can rely on the technology to record the attendance of trainees who come to PPDK, or they can record attendance for any program implemented by PPDK. However, the findings of the study show variables such as attractiveness, perspicuity, and stimulation are below average, but respondents can still accept the use of i-FRAS 2.0 technology well in PPDK. The benchmark result graph for the use of i-FRAS 2.0 is illustrated in Figure 5.

Table 4: Benchmark result of the i-FRAS 2.0 usage

Scale	Mean	Benchmark comparison	Interpretation
Attractiveness	0.93	Below average	50% of result better, 25% result worse
Perspicuity	1.00	Below average	50% of result better, 25% result worse
Efficiency	1.60	Good	10% of result better, 75% result worse
Dependability	1.50	Good	10% of result better, 75% result worse
Stimulation	0.83	Below average	50% of result better, 25% result worse
Novelty	2.23	Excellent	In the range of the 10% best results

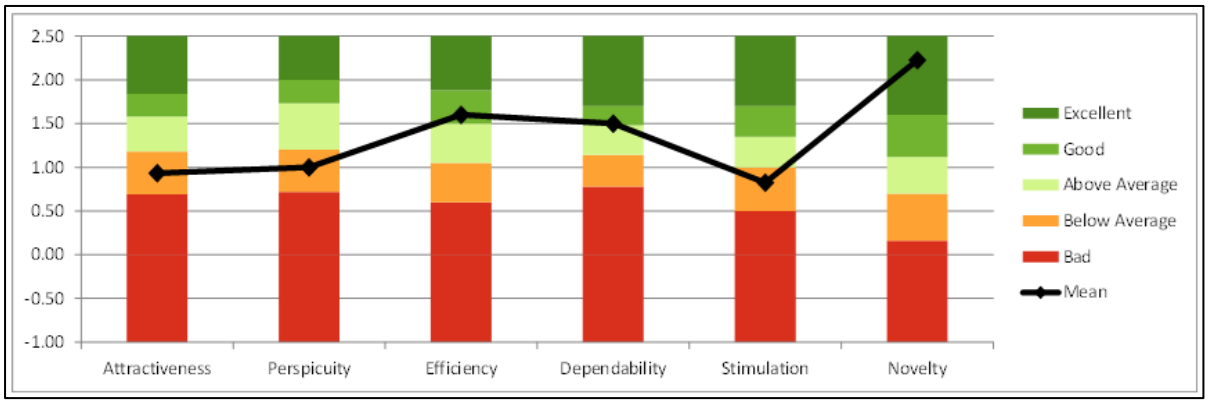

Figure 5: Graph result of benchmark for i-FRAS 2.0 usage

3.5 Qualitative Findings with Interview Session

To assess the effectiveness of the i-FRAS 2.0 technology transfer project, an interview was conducted with the user (supervisors) at PPDK Air Putih. The study revealed the findings that were categorised into four domains: productivity, governance, financial considerations, and intellectual property (IP) management. Table 5 shows the findings from interviews on the effectiveness of the use of technology transfer. The implementation of the i-FRAS 2.0 system brought notable improvements in productivity, particularly in streamlining attendance management. In terms of the productivity dimension, the user highlighted that the system significantly saved time and reduced manual effort. Specifically, the user strongly agreed that the system alleviated a critical operational challenge by automating attendance tracking and reporting processes for trainees, which had previously been time-consuming. However, while acknowledging the safety and quality of the product, the effectiveness of the technology transfer project was rated as moderate in terms of overall service delivery. The user also noted that while the system indirectly contributes to increased organisational efficiency, its direct impact on financial gains remains limited.

In terms of the government domain, the finding revealed that the user praised the project's governance for its effective communication and well-organised workflow. The user described the officers managing the project as responsive and professional, ensuring a smooth technology transfer process. This level of organisation not only enhanced the project's execution but also aligned with management expectations, fostering trust in future collaborations with the polytechnic. The structured approach to project management contributed to seamless coordination and demonstrated a commitment to maintaining high standards in technology adoption. Thus, strong governance plays a key role in the successful implementation of the technology transfer project at PPDK.

Moreover, effective financial planning was another key strength of the i-FRAS 2.0 technology transfer project. The user expressed satisfaction with the project's direct and indirect costs, highlighting that the existing budget allocation was sufficient to meet the requirements of the technology transfer initiative. This positive evaluation indicates that the financial planning and

resource allocation were both efficient and practical, ensuring that the project could be successfully implemented without exceeding budget constraints. The well-managed financial aspect of the project reflects a strategic approach to resource utilization, reinforcing its sustainability and feasibility.

In addition, intellectual property management emerged as a promising area for further collaboration in the next technology transfer project. The user expressed interest in the system and recognised its potential for future improvements. Although user knowledge in intellectual property management is limited, the PPDK supervisor showed a willingness to explore co-ownership and collaborate with polytechnics to improve the system. This openness reflects the readiness of this organisation to adopt innovative technologies, provided they receive proper guidance and support. The potential for joint development presents an opportunity for sustained innovation and knowledge-sharing between stakeholders.

Table 5: Findings from Interviews on The Effectiveness of The Use of Technology Transfer

Question	Answer
Productivity	
1. What is your view on this technology transfer program?	This technology transfer program is very beneficial, and I am looking forward to future collaboration with Polytechnic.
2. In your opinion, how is the quality of the products by polytechnics and community colleges?	In my opinion, the quality of products by polytechnics and community colleges is good.
3. In your opinion, does the product have good safety features and is it safe to use?	I agree that the products have good safety features and are safe to use.
4. Do you think this technology transfer project can increase your income?	I think that the results of this technology transfer project may slightly increase our income.
5. Do you think the services through the technology transfer project are effective after being used?	I find that the services provided through the technology transfer project are moderately effective after being used.
6. From your observation, can technology transfer increase profits in your institution?	Through my observation, the results of the technology transfer project can (indirectly) increase profits.
7. How do you see the results of the technology transfer project that can save time?	I strongly agree that the results of this technology transfer project can save time, especially in the attendance management of our trainees.
Governance	
1. What is your opinion about the officers managing this technology transfer project?	Officers handling this project are easy to deal with and always quick to act if notified of a problem.

Question	Answer
2. In your opinion, how does the communication approach occur during the technology transfer project?	I strongly agree that communication during the technology transfer project is effective.
3. From your observation, is the workflow of the technology transfer project implemented in a planned manner?	I believe that the workflow of the technology transfer project is well-planned.
Financial *Direct Costs (Example: Raw material costs, labour costs).* *Indirect Costs (Example: Transportation, rental, consultancy).*	
1. In your opinion, what is the effective direct cost of the technology transfer project?	I believe that the existing direct cost of this project is sufficient.
2. From your observation, what is the effective indirect cost of the technology transfer project?	I believe that the existing indirect cost of this project is effective and sufficient.
Intellectual Property (IP) Management	
1. Are you interested in the products from this technology transfer?	I am interested in this product (i-FRAS) if PBU can make some improvements to it.
2. Do you know that intellectual property is an important element in the legal ownership aspect?	Regarding this, my expertise is limited.
3. Are you interested in owning this product and agreeing to jointly apply for intellectual property ownership?	I am not sure, but it is very interesting to do.

4.0 Conclusion

The technology transfer of face recognition for recording attendance at PPDK Air Putih has successfully achieved the research objectives. First, user experience feedback on i-FRAS 2.0 was effectively gathered using the UEQ questionnaire, with notable strengths identified in the Novelty aspect (rated excellent) and good ratings for Efficiency and Dependability. However, Attractiveness, Perspicuity, and Stimulation were rated below average, indicating areas for improvement. Despite this, users found the technology acceptable and functional. Second, feedback from PPDK management highlighted significant benefits in automating attendance reporting and streamlining the preparation of trainee attendance reports for JKM compared to manual methods. This advancement has effectively addressed key operational challenges. For future development, enhancing the system's user interface to improve Attractiveness, Perspicuity, and Stimulation should be prioritised. Implementing a Raspberry Pi microprocessor as a replacement for the ESP32-CAM may improve system reliability and performance, contingent upon securing additional funding or grants. These improvements will further optimise the adoption and effectiveness of i-FRAS 2.0 at PPDK.

Acknowledgements
The authors would like to thank Politeknik Balik Pulau, Penang and Jabatan Pendidikan Politeknik dan Kolej Komuniti, for supporting this research. The authors also thank the PPDK Air Putih, Balik Pulau, Penang, for providing an opportunity to implement the face recognition technology transfer through i-FRAS 2.0. This research was supported by the PPI, JPPKK. Additionally, the i-FRAS 2.0 was registered for copyright (CRLY2024W01019).

Author Contributions
R.C. Tan: Conceptualisation, Introduction, Methodology, Programming Software, Technology Development, Writing, Data Collection; **N. Yusof:** Abstract, Methodology, Result, Discussion, Editing, Writing-Reviewing, Supervision; **S. Hussin:** Original Draft Preparation, Methodology, Result, Discussion, and Editing.

Conflicts of Interest
The manuscript has not been published anywhere else and is not being considered by any other journals. All authors have authorised the review, agree with the submission, and state that they have no conflicts of interest in the work.

References
Amran, A., Putri, Y. A. C., Susmawati, P. R., Aulita, R. N., Astutik, A., & Fitria, Y. (2024). Evaluating the user experience of online transportation applications with the UEQ approach to people's lifestyles. *Jurnal Mandiri IT*, *12*(4), 229–235. https://doi.org/10.35335/mandiri.v12i4.256

Aulia, E. (2024). Analisis user experience aplikasi Twitter menggunakan metode User Experience Questionnaire (UEQ). *Jurnal Teknik Dan Science*, *3*(1), 31–39. https://doi.org/10.56127/jts.v3i1.907

Bernardini, A., Chieppa, A., Cibella, N., & Zindato, D. (2024). Improving the design of the Italian permanent population and housing census: A transition towards a massive use of administrative data. *Metron*, *82*(1), 5-17.

Giyai, Y., Inan, D. I., & Baisa, L. Y. (2024). Evaluation of user experience on Laporkitong Mobile Application utilizing user experience questionnaire (UEQ). *MALCOM: Indonesian Journal of Machine Learning and Computer Science*, *4*(3), 736-744.

Hashim, N. L., Yusof, N., Hussain, A., & Ibrahim, M. (2022). User experience dimensions for e-procurement: A systematic review. *Journal of Information and Communication Technology*, *21*(4), 465–494. https://doi.org/10.32890/jict2022.21.4.1

Khoirunnisa, S., & Sondari, M., C. (2024). Analisis user experience Aplikasi Halo Hermina menggunakan metode user experience questionnaire (UEQ). *Nusantara Journal of Multidisciplinary Science*, *1*(6), 49–61. https://jurnal.intekom.id/index.php/njms/article/view/246

Kopalidis, T., Solachidis, V., Vretos, N., & Daras, P. (2024). Advances in facial expression recognition: A survey of methods, benchmarks, models, and datasets. *Information*, *15*(3), 135.

https://doi.org/10.3390/info15030135

Kuwar, V., Srivastava, Y., Gaur, S., Yadav, A., Bhide, P., & Upreti, S. (2025). Enhancing user experiences in cyber-physical systems for real-time feedback and intelligent automation. In R. C. Poonia & K. Upreti (Eds.), *Navigating Cyber-Physical Systems with Cutting-Edge Technologies* (pp. 215-234). IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3693-5728-6.ch008

Lynch, N. (2024). Facial recognition technology in policing and security - case studies in regulation. *Laws*, *13*(3), 35.

Schrepp, M., Hinderks, A., & Thomaschewski, J. (2014). Applying the user experience questionnaire (UEQ) in different evaluation scenarios. in Marcus, a. (Eds.), *Design, user experience, and usability. Theories, methods, and tools for designing the user experience* (pp. 383–392). Springer International Publishing. https://doi.org/10.1007/978-3-319-07668-3_37

Shoozan, A., & Mohamad, M. (2024). Application of interview protocol refinement framework in systematically developing and refining a semi-structured interview protocol. In B.Z. Melani, M. Mohamad, L.R.T. Savalas, D. Ocampo & M.Z. Abdul Majid (Eds.), *5th Annual Conference on Education and Social Sciences* (pp. 1-12). EDP Sciences.

Yusof, N., Matzin, A., Hashim, N. L., & Matraf, M. S. B. (2024). User experience of augmented reality applications for future studies: A thematic review. *Journal of Advanced Research in Applied Sciences and Engineering Technology,* 91-102. https://doi.org/10.37934/araset.60.2.91102

Yusof, N., Hashim, N. L., & Hussain, A. (2022). Quality requirements of electronic procurement system for enhancing its user experiences (UX). *International Journal on Advanced Science, Engineering and Information Technology*, *12*(6), 2469-2475. https://doi.org/10.18517/ijaseit.12.6.16040

Yusof, N., Hashim, N. L., & Hussain, A. (2022). A conceptual user experience evaluation model on online systems. *International Journal of Advanced Computer Science and Applications*, *13*(1), 428-438. https://doi.org/10.14569/ijacsa.2022.0130153

Yusof, S. C. M., Ismail, N., Mohammad, A., Haris, M. F., Haron, R., Zain, R. M., & Nasir, M. H. A. (2019). Pemindahan teknologi penghasilan teh cendawan kepada komuniti berpendapatan rendah dalam program bina upaya untuk peningkatan sumber pendapatan dan usahawan. Konvensyen Teknikal Nuklear Malaysia 2019, Bangi, Selangor, Malaysia.