4

Telecounseling Media Based on Facial Expression Analysis as a Tool for Detecting Students' Suicidal Tendencies

***Aditya Ramadito Rahman[1], Amiirah Aniisah[2], M. Aldwin Priyatama[3], Wzamah Al Hussein[4], Muhibuddin Fadhli[5], Zainul Abidin[6], Otto Fajarianto[7]**

[1,2,3,4,5,6,7]Universitas Negeri Malang, Jl. Semarang 5, Malang, East Java, Indonesia

*aditya.ramadito.2101216@students.um.ac.id

Abstract: *This research aims to assess the implementation and effectiveness of telecounseling media based on facial expression analysis in detecting suicidal tendencies in students. The method used is a quantitative research design. This research will measure the level of effectiveness through assessments from experts and data analysis using statistical methods. The results of implementation using pilot tests three times showed that 2 out of 3 counsellors had moderate suicidal tendencies, and effectiveness tests by Informatics and Psychology experts using the Cohen's Kappa method showed that this telecounseling media was effective in capturing facial expressions during counselling sessions as well as trouble graphs. FEA is accurate in describing the client's emotional condition.*

Keywords: *Telecounseling Media, Facial Analysis, Detection Tool, Suicide.*

Introduction

In recent years, there has been increasing attention to mental health issues among college students, especially concerning suicide tendencies. Research shows that college students often experience significant stress that can potentially increase the risk of mental disorders, including depression and suicide tendencies (Khan et al., 2019). The need for effective and rapidly accessible interventions is crucial to addressing this issue. One of the latest innovations in this field is the use of telecounseling media based on facial expression analysis, which offers a new approach to early detection of suicidal tendencies among college students (Smith & Jones, 2021).

Telecounseling as a mental health intervention has experienced rapid development in the last decade. Several studies have shown that telecounseling can be an effective alternative to face-to-face counselling, especially in contexts that limit physical interaction (Brown & Green,

DOI: https://doi.org/10.54956/edukasi.v12i2.634

2018). Facial expression analysis technology, which allows the analysis of facial expressions to detect emotional changes, is one emerging tool in this context that offers the potential to improve the early detection of suicide risk (Lee et al., 2020).

Nexmind offers a web-based solution designed to make it easier for students to access online counselling services. Through facial expression analysis (FEA) integration, Nexmind offers online counselling sessions and additional features that can detect emotional changes that the user or counsellor may not notice. This early detection is key in suicide prevention efforts, where timely intervention can prevent more serious actions (Daulay et al., 2024).

In its use, Nexmind utilizes the camera on the user's device to record and analyze facial expressions during counselling sessions. An artificial intelligence (AI)-based algorithm then processes the data to recognize certain emotional patterns associated with suicide risk, such as deep sadness, excessive anxiety, anger, and several other emotions. This technology can identify early signs of suicidal tendencies so that counsellors can provide appropriate and timely interventions (Feeny et al., 2024).

While this technology is promising, it is important to understand how it is implemented in the field and how effective it is in practice. Research by Garcia et al. (2023) suggests that facial expression analysis can provide valuable insights into a person's emotional state. However, its effectiveness in telecounseling needs to be explored further.

The implementation of telecounseling media based on facial expression analysis has the potential to be an important part of this innovation. By utilizing facial expression analysis, this media can provide more accurate data on students' emotional conditions and help counsellors make more appropriate decisions in the intervention process (Wilson & Thompson, 2021).

The effectiveness of telecounseling media based on facial expression analysis in the context of detecting suicidal tendencies in students still needs further research. Several studies have shown this technology's potential in improving emotional detection accuracy (Schlegel et al., 2021). However, implementing and adapting this technology in an academic environment need thorough evaluation to ensure that this tool is effective and accessible to students.

With a focus on the implementation and effectiveness of telecounseling media based on facial expression analysis, this research aims to assess the implementation and effectiveness of telecounseling

DOI: https://doi.org/10.54956/edukasi.v12i2.634

media based on facial expression analysis in detecting suicidal tendencies in college students.

Method

This research uses a quantitative research design. This research will measure the level of effectiveness through expert assessments and data analysis using statistical methods. The population of this research is students enrolled in universities in Malang City. The sample will be taken by purposive sampling, using the criteria of students who have access to telecounseling services based on facial expression analysis. To assess effectiveness, the sample consists of experts in psychology and information technology who have experience in facial expression analysis and telecounseling. The main instrument in this research is a telecounseling media based on facial expression analysis that has been developed and tested. Additional instruments include a questionnaire for effectiveness assessment and an expert assessment form. The effectiveness assessment collected expert feedback regarding the technology's functionality, accuracy, and relevance in detecting suicidal tendencies.

Data is collected through two main stages: a) Technology Trial: Telecounseling media based on facial expression analysis will be trialled with a group of students to collect initial data on its effectiveness in emotional detection. b) Expert Assessment: Experts in psychology and technology will be asked to evaluate the system using a specially designed questionnaire. The assessment covers aspects such as accuracy, ease of use, and practical application in detecting suicidal tendencies. Data collected from expert assessments will be analyzed using Cohen's Kappa reliability test to determine the level of agreement between raters (Cohen, 1960). This test is conducted using SPSS software. Cohen's Kappa will provide an indication of the extent of agreement between raters regarding the effectiveness of telecounseling media in detecting suicidal tendencies (McHugh, 2012).

Result and Discussion

Website and Facial Expression Analysis Implementation

Implementation was carried out using a website pilot test three times with participants from counsellors and clients in Malang City. This trial involved three counsellors and three clients, consisting of two people from State Universities (PTN) and one person from a Private

DOI: https://doi.org/10.54956/edukasi.v12i2.634

University (PTS) in Malang City. The following are the results of the trial.

1. Pilot Test 1

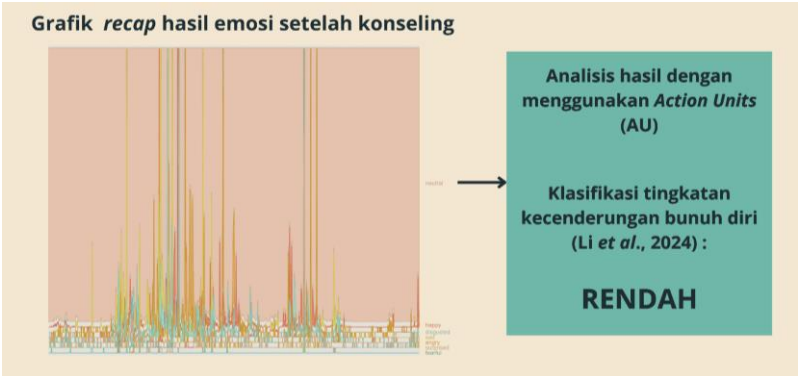

Figure 1. *FEA pilot test 1 report graph*

The intensity of the appearance of facial expressions from the counselling results in the form of a graph is as follows: 1) sad: high 3 times, medium-low 5 times, low 6 times, 2) angry: high 4 times, medium-low 1 time, low 4 times, 3) disgust: high 2 times, medium-low 7 times, low 2 times, 4) happy: high 2 times, medium-low 9 times, low 6 times.

Based on the results of the interpretation of the counselling session, it is known that the client with the initials MH has a low tendency to commit suicide. The frequency of facial expressions is obtained based on Action Units (AU). Happy expressions, with a percentage of 55.76%, appear more often than sad expressions 45.92%, and angry 22.14%, which are marked as expressions related to suicidal thoughts.

2. Pilot Test 2

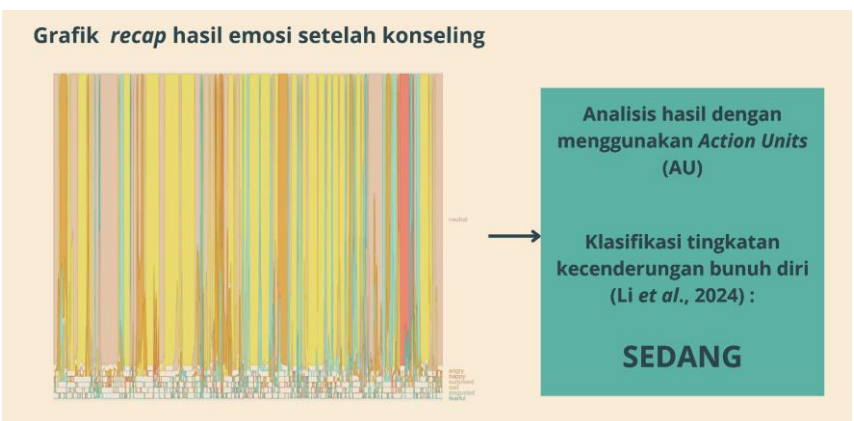

Figure 2. *FEA pilot test 2 report graph*

DOI: https://doi.org/10.54956/edukasi.v12i2.634

The intensity of the appearance of facial expressions from the counselling results in the form of a graph is as follows: 1) sad: high 11 times with several fairly long intervals, medium-low 3 times, low 2 times, 2) angry: high 7 times with one of them at a fairly long interval, medium-low 7 times, low 4 times, 3) happy: high 4 times with one of them at a fairly long interval, medium-low 1 time, low none.

Based on the results of the interpretation of the counselling session, it is known that the client with the initials WH has a moderate tendency to commit suicide. The frequency of facial expressions is obtained based on Action Units (AU). Sad expressions as a sign of suicidal thoughts have a percentage of 52.48%, higher than anger 44.28%, and happiness 16.4%. Details of the indicators can be seen in.

3. Pilot Test 3

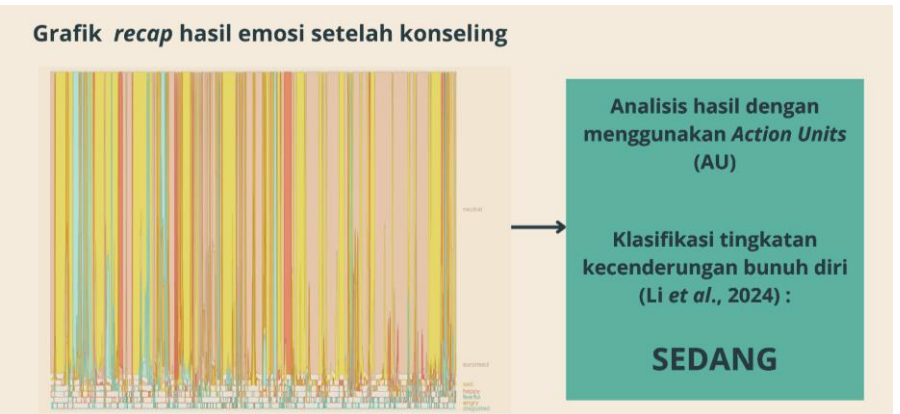

Figure 3. *FEA pilot test 3 report graph*

The intensity of the appearance of facial expressions from the counselling results in the form of a graph is as follows: 1) sad: high 3 times, medium-low 1 time, low 8 times, 2) angry: high none, medium-low 2 times, low 1 time, 3) happy: high 1 time, medium-low 1 time, low none, 4) surprised: high 2 times, medium-low 14 times, low 11 times.

Based on the results of counselling, it is known that the client with the initials BD has a moderate suicidal tendency. The frequency of facial expressions is obtained based on Action Units (AU). Sad expressions as a sign of suicidal thoughts have a percentage of 39.36%, higher than anger 7.38% and happiness 6.56%.

Website Effectiveness and Facial Expression Analysis

The effectiveness test using the expert judgment method involves assessments from two experts in the field of Information Technology and two experts in the field of Psychology. The results of the assessment

DOI: https://doi.org/10.54956/edukasi.v12i2.634

were tested for reliability using Cohen's Kappa (Garcia et al., 2023). The results of the test on the assessment of Information Technology experts can be seen in Figure 4 below.

Table 1. Cohen's Kappa results in the field of informatics engineering

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Measure of Agreement	Kappa	.750	.226	2.191	.028
N of Valid Cases		8			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Based on the test results above, the coefficient value is knownKappaof 0.750. This value indicates a substantial agreement among experts in the field of information technology that website media is effective for telecounseling and can capture the client's facial expressions during the counselling session.

The test results based on expert assessments in the field of Psychology can be seen in Figure 5 below.

Table 2. Cohen's Kappa results in psychology

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Measure of Agreement	Kappa	.667	.287	1.732	.083
N of Valid Cases		6			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Based on the test results above, the Kappa coefficient value is 0.667. This value indicates a substantial agreement among experts in the field of Psychology that the FEA result report is included in the accurate category to show the client's facial expressions during the counselling session.

So, it can be concluded from the test results conducted by experts that the website integrated with FEA as a tool for detecting suicidal tendencies in students has proven effective.

Conclusion

In the implementation stage, a pilot test of the website was conducted three times involving three counsellors and three clients, and

DOI: https://doi.org/10.54956/edukasi.v12i2.634

the results showed that 2 out of 3 clients had moderate levels of suicidal tendencies. The effectiveness test was conducted using expert judgment methods from the fields of Informatics Engineering and Psychology to evaluate the website's effectiveness. Based on the test results, it is known that the Kappa coefficient value for the Informatics Engineering field is 0.750, which indicates a substantial agreement that the website media is effective for telecounseling and can capture the client's facial expressions during the counselling session. Meanwhile, the Kappa coefficient value for the Psychology field is 0.667, indicating a substantial agreement that the FEA report accurately shows the client's facial expressions during the counselling session. Thus, it can be concluded that the website integrated with FEA has proven to be effective as a tool for detecting suicidal tendencies in students.

Acknowledgements

On this occasion, the author would like to thank all parties who have supported the implementation of this research. In particular, the author would like to thank the Ministry of Education, Culture, Research, and Technology for providing an opportunity for us, the young research team, to conduct this research. Thanks are also expressed to the State University of Malang for facilitating and providing intensive assistance to us in implementing this research from beginning to end. It is hoped that this research can contribute to the wider community and eradicate the problems that are currently occurring.

Bibliography

Brown, A., & Green, T. (2018). Beyond teaching instructional design models: exploring the design process to advance professional development and expertise. *Journal of Computing in Higher Education*, *30*(1). https://doi.org/10.1007/s12528-017-9164-y

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, *20*(1), 37–46. https://doi.org/10.1177/001316446002000104

Daulay, N., Harahap, A., & Sinaga, M. (2024). Online Counseling Online counselling-based information services: How can it reduce students' academic stress? *Persona:Jurnal Psikologi Indonesia*, *12*(2), 169–181. https://doi.org/10.30996/persona.v12i2.8117

Feeny, A., Sousa, F., & Wessel, P. (2024). University and college

counselling services in Scotland: One-on-one counselling amid the student mental health crisis. *Counselling and Psychotherapy Research*. https://doi.org/10.1002/capr.12858

Garcia, H., Rodriguez, P., & Zhang, Y. (2023). Facial expression analysis in mental health: Opportunities and challenges. *Computers in Human Behavior*, *131*, 107–115. https://doi.org/10.1016/j.chb.2022.107115

Khan, A., Gupta, V., & Martinez, J. (2019). Prevalence and predictors of suicide risk among college students. *Journal of Affective Disorders*, *259*, 431–439. https://doi.org/10.1016/j.jad.2019.08.053

Lee, C., Smith, D., & White, J. (2020). Facial expression analysis for mental health: A review of current applications. *International Journal of Mental Health and Addiction*, *18*(3), 672–689. https://doi.org/10.1007/s11469-019-00133-9

McHugh, M. L. (2012). Interrater reliability: The kappa statistic. *Biochemia Medica*, *22*(3), 276–282. https://doi.org/10.11613/BM.2012.031

Schlegel, K., Scherer, K. R., & Kreibig, S. D. (2021). Facial expression analysis for emotion detection in mental health. *Emotion*, *21*(2), 282–293. https://doi.org/10.1037/emo0000731

Smith, A., & Jones, R. (2021). Innovations in telecounseling: A review of emerging technologies. *Journal of Behavioral Health Services & Research*, *48*(1), 45–58. https://doi.org/10.1007/s11414-020-09698-3

Wilson, E., & Thompson, S. (2021). Utilizing facial expression analysis in telehealth: A systematic review. *Telemedicine and E-Health*, *27*(8), 755–765. https://doi.org/10.1089/tmj.2020.0305