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Field trial of Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* mods

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ABSTRACT

The purpose of this study was to demonstrate the effectiveness level of the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification through the results of field trials. This evaluation application was an evaluation tool formed by a combination of educational evaluation models (Provus model and Alkin model), decision support system methods (weighted product), and the concept of Balinese local wisdom (*Rwa Bhineda*). This research approach was developed, using the Borg and Gall model. The focus of the development phase in this study was field trials and revisions to field trials. The tool used to provide scores by respondents in field trials was a questionnaire. Subjects involved in field trials were 164 respondents. The research location was at several IT vocational schools in Bali. Data analysis was done by comparing the results of field trials with effectiveness standards referring to a five scale. The results showed that the percentage of effectiveness was 81.20%. It proved that the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification was good. The impact of the results of this research is as a trigger to develop innovations in educational evaluation by integrating various fields of science (multidisciplinary science) in the form of one digital application.

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1. INTRODUCTION

Synchronous and asynchronous are suitable learning strategies for supporting the learning process at IT vocational schools in Bali since the outbreak of the covid-19 pandemic and post-covid-19. Even so, in reality, the learning is not effectively applied to several IT vocational schools which still have limitations. The limitations in question include: unpreparedness of human resources, limited supporting equipment, lack of socialization process, inequality of learning outcomes with set standards, and indicators determining the effectiveness of learning are not well measured. Based on this, it is necessary a comprehensive evaluation of the implementation of asynchronous and synchronous learning at IT vocational schools in Bali. Evaluation activities are necessary to determine learning effectiveness [1]–[6]. The evaluation requires adequate

components and aspects. But the fact shows that not all evaluation models have evaluation components and aspects that match the characteristics of the evaluation object.

Therefore, a breakthrough evaluation tool is needed that can determine the dominant indicators determining the effectiveness of asynchronous and synchronous learning at IT vocational schools in Bali based on appropriate evaluation components. One of the evaluation tools offered is in the form of an evaluation application for the Provus-Alkin-amalgamation based on the Weighted-Product-*Rwa-Bhineda* modification. This application combines the Provus and Alkin evaluation models, as well as the Weighted Product method and the Balinese local wisdom concept of "*Rwa Bhineda*".

This application was created in 2022 and has been tested early. However, initial trial results weren't strong enough to prove the application's quality. Therefore, field trials are notable. Based on these needs, this research purpose was to show the results of field trials on the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification. So, the research question arises, namely: What are the results of field trials on the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification?

This research was in a place because inspired by several studies and the limitations of previous studies. Research by Wirawan *et al*. [7] showed the display of digital learning applications that had been made but has not shown the trial stages of the application. Research by Rachmadtullah *et al*. [8] showed that there were field trials of interactive learning media but has not shown the display of learning media in detail yet. Research by Divayana *et al*. [9] showed the user interface design display of the digital test application. Research limitations Divayana *et al*. is not showing the physical appearance of the application and field trials of the digital test application. Research by Divayana *et al*. [10] has similarities to this study in showing the display of a digital evaluation application to measure the effectiveness of an object. Another similarity is that this digital evaluation application is equally used to determine the dominant indicator as a determinant of the effectiveness of an object. Supadi's research [11] showed the display of a digital assessment application that was used to assess the absorption of schools in implementing Education 4.0. The limitation is that there has not been a comprehensive trial of the digital assessment application.

2. METHOD

2.1. Research approach

This study used a development approach. The model used for development was the Borg and Gall model. The Borg and Gall model has ten stages of development [12]–[17], including i) research and field data collection; ii) planning; iii) design development; iv) initial trials; v) revisions to the results of the initial trial; vi) field trials; vii) revision of the results of the field trial; viii) usage trials; ix) final product revisions; and x) dissemination and implementation of the final product. In the 2022 research, five stages of development had carried out, including i) research and field data collection; ii) planning; iii) design development; iv) initial trials; and v) revisions to the results of the initial trial. Specifically for the 2023 research, the development was focused on the field trial and field trial revision phases.

2.2. Research location

This research location was at several IT vocational schools spread across six regencies in Bali. The regencies in question include Buleleng, Gianyar, Tabanan, Denpasar, Badung, and Klungkung. The reason for choosing research locations in those six regencies was those locations represent all IT vocational schools in the Bali area.

2.3. Data collection instruments

The instruments used in collecting data in this study were photo documentation and questionnaires. The questionnaires were used to obtain primary data in quantitative data. It was from respondents as a basis for making decisions about the effectiveness percentage of the field trial on evaluation applications. Photo documentation was used as proof that this study was indeed carried out and used as valid evidence showing the source of primary and secondary data obtained in this study.

2.4. Data analysis techniques

The technique used to analyze the data that had been collected was a quantitative descriptive technique through percentage descriptive calculations. The calculation results of descriptive percentage were used as a basis for interpreting the results of field trial. The percentage calculation descriptive formula was as follows [18]–[23].

$$P = \frac{f}{N} \times 100\% \quad (1)$$

Notes: f=Total acquisition value; N=maximum total value.
The percentage results were obtained from the formula and then converted into the five's scale categorization. That categorization can be seen in Table 1 [24]–[32].

Table 1. Conversion of quality level with five's scales

Quality Level (%)	Category	Recommendations
90-100	Excellence	Not revised
80-89	Good	Not revised
65-79	Moderate	Revised
55-64	Less	Revised
0-54	Poor	Revised

3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. The display of the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification

The Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification has several forms. Those forms, included: the main menu, input of evaluation aspect data, the input of weight data, the process of calculating respondent's perception data, the process of calculating alternative domains, and decision results. The display of those forms can be seen in Figure 1 to Figure 6.

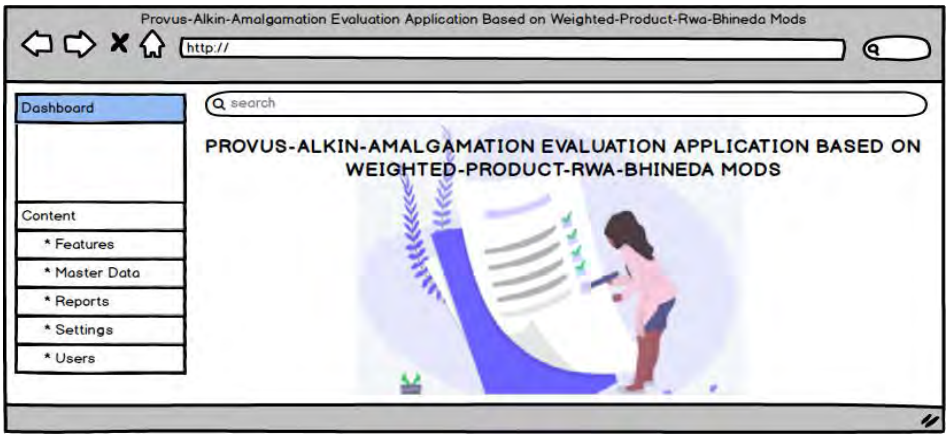

Figure 1. Main menu

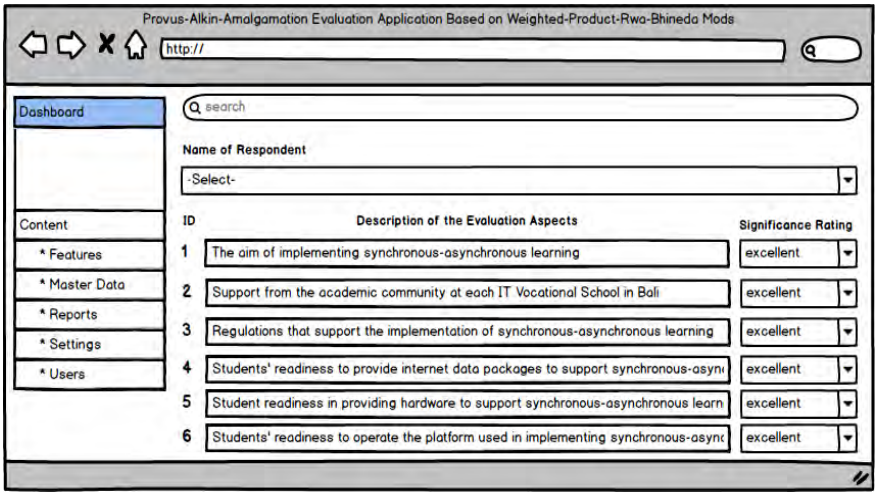

Figure 2. Input of evaluation aspect data

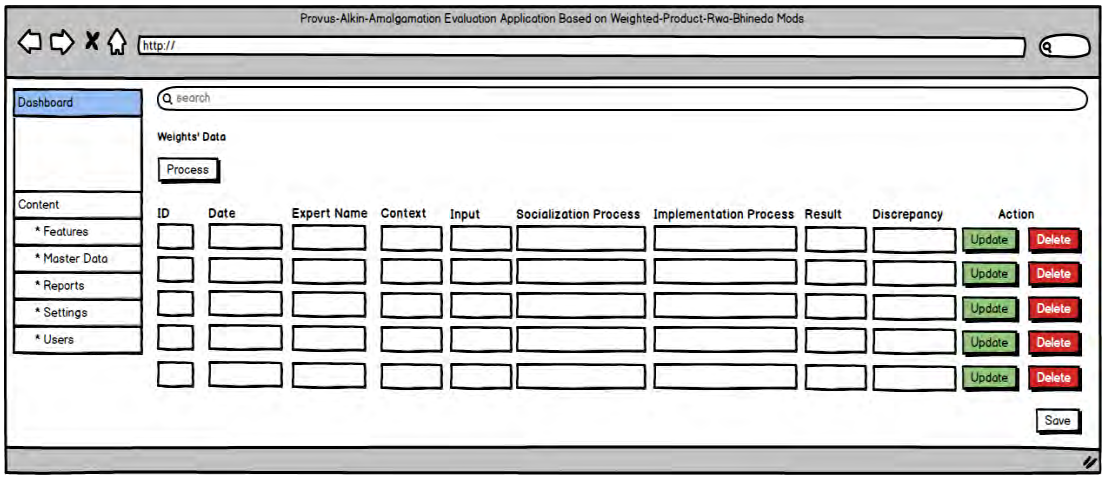

Figure 3. Input of weights' data

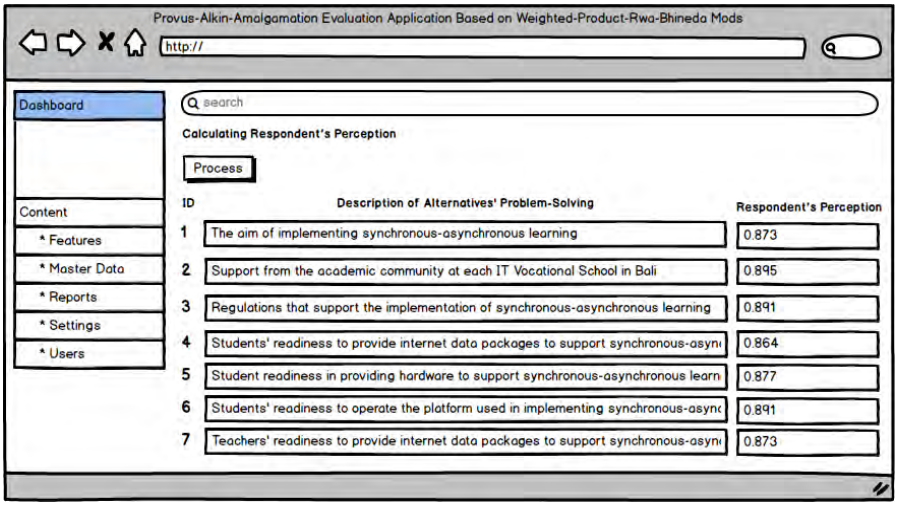

Figure 4. The process of calculating respondent's perception data

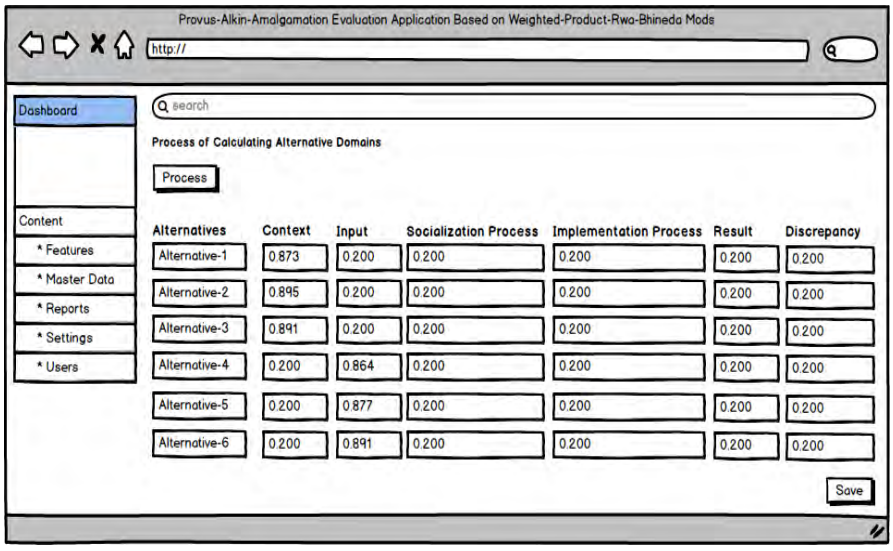

Figure 5. The process of calculating alternative domains

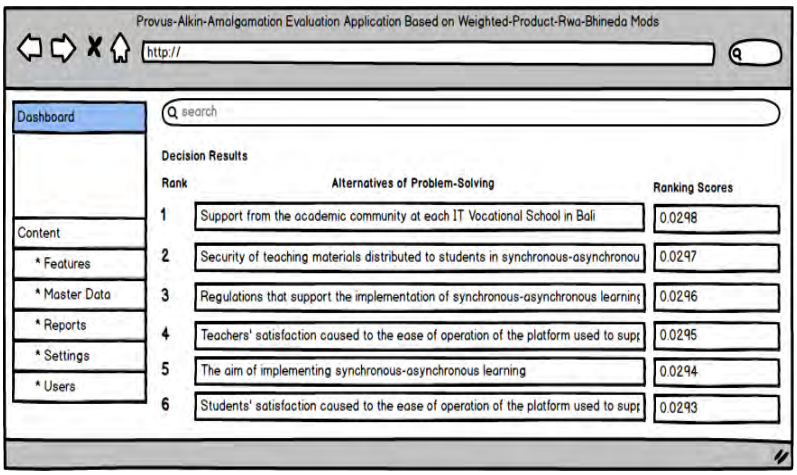

Figure 6. Decision results

Figure 1 shows the main menu form of the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification. This main menu consists of five sub-menus. The five sub-menus included: features, master data, reports, settings, and users.

Figure 2 shows the form for inputting data on evaluation aspects. There are three fields displayed in this form. Those three fields, included: ID, description of the evaluation aspects, and significance rating for each evaluation aspect. The ID and description of the evaluation aspects are input using the textbox facility, while the significance rating is input using the combo-box facility.

Figure 3 shows a form that functions to input weight data. There are nine fields displayed in this form. Those nine fields, included: ID, date, expert name, context component, input component, a component of the socialization process, component of implementation process, component of results, and component of discrepancy.

Figure 4 shows a form that functions to calculate respondents' perception data. There are three fields displayed in this form. Those three fields, included: ID, description of alternative problem-solving, and respondents' perception scores.

Figure 5 shows a form that functions to calculate alternative domains. There are seven fields displayed in this form. Those seven fields, included: i) alternative, ii) respondents' perception scores on the context component, iii) respondents' perception scores on the input component, iv) respondents' perception scores on the socialization process component, v) respondents' perception scores on the implementation process, vi) respondents' perception scores on the results component, and vii) respondents' perception scores on the discrepancy component.

Figure 6 shows a form that functions to display decision results. There are three fields displayed in this form. Those three fields, included: rank, alternatives of problem-solving, and ranking scores. Alternatives' problem-solving are determined based on solutions integrated on the *Rwa Bhineda* concept. The ranking scores are obtained from the results of the weighted product calculation.

3.1.2. Results of field trials on Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification

Field trials of the Provus-Alkin-amalgamation evaluation application based on the Weighted-Product-*Rwa-Bhineda* modification involved two educational experts, two informatics experts, sixty teachers, and a hundred IT vocational school students spread in Bali. The results of field trials can be seen in Table 2 (see in Appendix). Respondents also provided several suggestions in addition to providing an assessment score for each of the field trial questionnaire questions. Those suggestions were used as a basis for making improvements to the application. Suggestions from some of those respondents can be seen in Table 3 (see in Appendix).

3.1.3. Revision of field trial results for Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification

Based on the suggestions given by respondents E-02, T-53, and S-15, a revision was made to the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification. The revision was carried out by adding a feature to regulate master data activation. The feature display for managing the activation of the master data can be seen in Figure 7.

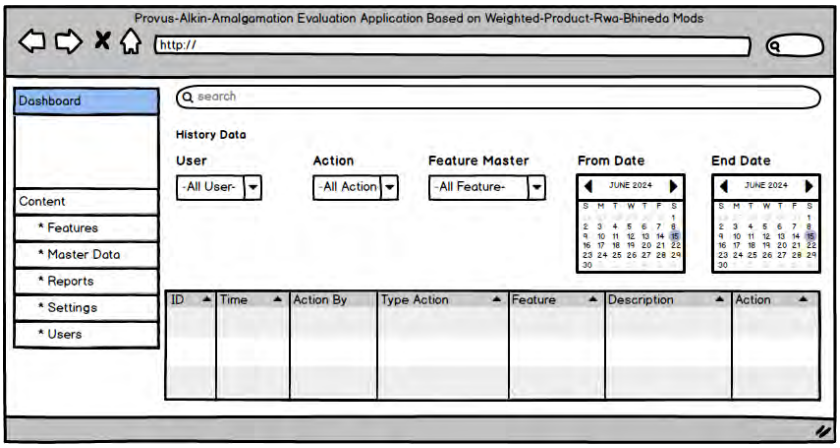

Figure 7. Display of features to manage master data activation

Figure 7 shows a form that contains features for managing master data activation. There are five fields displayed in this form. Those five fields, included: user, action, master feature, start date, and end date. In the user field, there is a combo-box menu that contains data about system users, including admin, experts, and all respondents. In the action field, there is a combo-box menu that contains facilities for updating and deleting. In the master feature field, there is a combo-box menu that contains data about all the menus in the application. In the start date field, there is a date-time-picker menu to set the activity start date. In the end date field, there is a date-time-picker menu to set the date to stop activities.

Based on the suggestions given by respondents E-03, T-48, and S-94, a revision was made to the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification. The revision was carried out by adding a feature for editing the significance rating score. The feature display for editing the significance rating score can be seen in Figure 8.

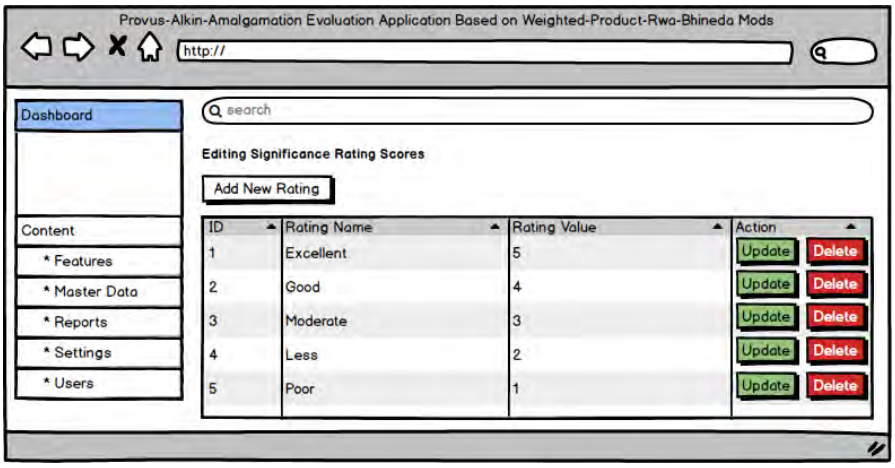

Figure 8. Display of features for editing significance rating scores

Figure 8 shows a form that contains features for editing the significance rating score. There are three fields displayed in this form. Those three fields, included: ID, rating name, and rating value. ID is used to indicate the code/sequential number of ratings. Rating name is used to indicate a description of the rating. Rating value is used to indicate the significance rating scores. Besides, there are two buttons in the 'Action' section which are used as a facility to edit the significance rating scores.

Based on the suggestions given by respondents T-06, T-60, and S-35, a revision was made to the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification. The revision was carried out by adding a feature to regulate user access rights. The feature display for setting user access rights can be seen in Figure 9.

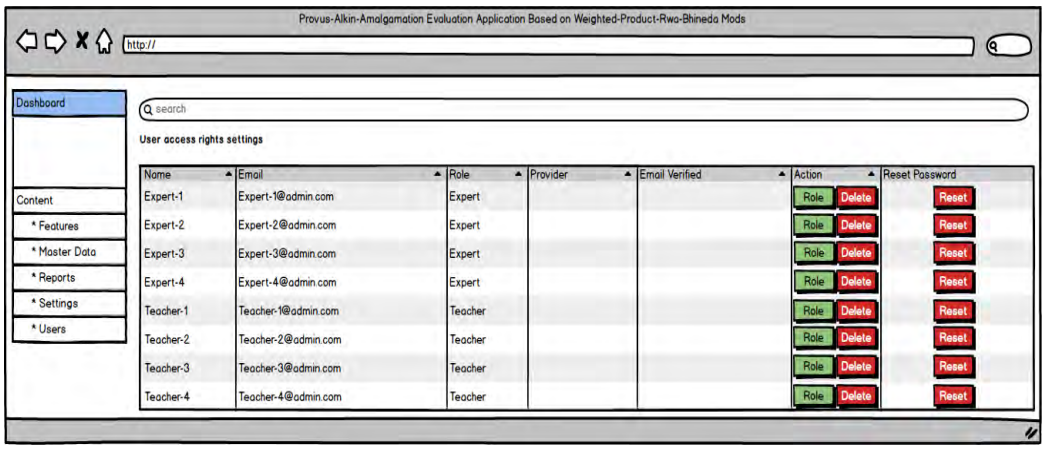

Figure 9. Display of features to set user access rights

Figure 9 shows a form that contains features for managing user access rights. There are five fields displayed in this form. Those five fields, included: name, email, role, provider, verified email. Besides, there are two buttons in the 'Action' section and one button in the 'Reset Password' section. Two buttons (role and delete) in the 'Action' section are used as a facility to edit user roles and user access rights. One reset button in the 'Reset Password' section is used to reset the password. Based on the suggestions given by respondents T-28 and S-87, a revision was made to the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification. The revision was carried out by adding a feature to edit the weights given by experts. The feature display for editing the weights given by experts can be seen in Figure 10.

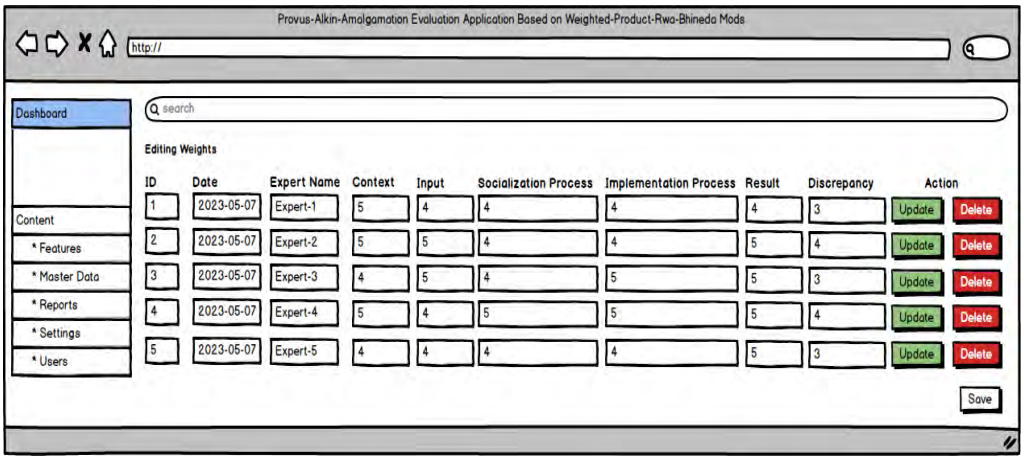

Figure 10. Display of features for editing weights assigned by experts

Figure 10 shows a form that contains features for editing the weights given by experts. There are nine fields displayed in this form. Those nine fields, included: i) ID, ii) date, iii) experts' name, iv) context component, v) input component, vi) component of socialization process, vii) component of implementation process, viii) component of results, and ix) component of discrepancy. Besides, there are two buttons in the 'Action' section which are used as a facility to edit the weight scores given by experts.

3.2. Discussion

The results of field trials on the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification showed an effectiveness percentage of 81.20%. These results prove that the level of effectiveness of the evaluation application is good, although there have been several revisions that have been made based on suggestions given by respondents during field trials. In principle, this study has similarities with several studies conducted by Tamur *et al*. [33], Khamis and Li [34], Abdulla and

Marhoon [35], Gasah *et al*. [36], Ninghardjanti and Dirgatama [37], Saleh *et al*. [38], Ariff *et al*. [39], and Machmud *et al*. [40]. The similarity is related to the existence of field trials on the applications to demonstrate its quality/effectiveness. The novelty of this study is that the percentage of effectiveness from the results of field trials on the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification is accurate and transparent. This evaluation application is an innovation that combines several scientific concepts, including education, computers, and culture. The scientific concept of education used as the basis for making this application is educational evaluation (they are the *Provus* evaluation model and *Alkin* evaluation model). The scientific concept of the computer used is one of the decision support system methods ("Weighted Product"). The scientific concept of culture used is one of Bali's local wisdoms ("*Rwa Bhineda*"). This research has a real contribution to solving the limitations of Wirawan *et al*. [7], Research by Rachmadtullah *et al*. [8], study by Divayana *et al*. [9], Supadi's research [11], showed the results of transparent field trials with an accurate calculation process. The limitation of this research is that there has not been a test on the use and application on a wider scale for the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification.

4. CONCLUSION

The results of field trials on the Provus-Alkin-amalgamation evaluation application based on Weighted-Product-*Rwa-Bhineda* modification showed relatively good application effectiveness. So, it could continue for wider-scale applications. Future work that needs to be done to overcome the constraints of this research is to conduct trials on the use and application of the application to a wider-scale. The impact of the results of this research is as a trigger and knowledge to develop innovations in the field of educational evaluation by integrating several fields of science (educational science, computers, and culture) in the form of one digital application.

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APPENDIX

Table 2. Results of field trials on Provus-Alkin-amalgamation evaluation application based on the Weighted-Product-*Rwa-Bhineda* modification

Respondents	Items-															Percentage of Effectiveness
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
E-01	4	4	4	4	4	4	4	4	4	5	5	3	4	4	5	82.67
E-02	4	3	3	4	4	4	4	4	4	4	5	4	5	4	5	81.33
E-03	5	4	4	4	4	4	4	4	3	4	4	4	5	4	4	81.33
E-04	4	4	5	4	4	5	5	5	5	4	4	4	4	3	4	85.33
T-01	5	4	4	4	4	4	4	4	4	4	4	4	4	4	3	80.00
T-02	4	4	4	4	4	4	4	4	4	5	5	4	4	4	4	82.67
T-03	4	4	4	4	4	4	4	4	4	4	4	3	4	5	5	81.33
T-04	4	4	5	5	5	5	5	5	3	4	4	5	5	5	5	92.00
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T-59	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	80.00
T-60	3	3	5	5	5	3	3	3	3	5	5	3	3	3	3	73.33
S-01	5	5	3	3	3	4	4	4	4	3	3	4	4	4	4	76.00
S-02	4	5	4	4	4	4	4	4	4	4	4	4	4	4	4	81.33
S-03	4	4	5	3	4	4	3	3	3	3	4	4	5	4	4	76.00
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
S-04	4	4	5	4	5	4	4	4	4	4	3	5	4	4	4	82.67
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S-99	4	4	3	3	3	3	4	4	4	4	5	4	4	4	4	76.00
S-100	5	4	4	4	4	4	4	4	4	4	4	4	5	4	4	82.67

Table 3. Suggestions for improvement from respondents on the Provus-Alkin-amalgamation evaluation application based on the Weighted-Product-*Rwa-Bhineda* modification

Respondents	Suggestions
E-02	A feature needs to be added to manage master data activation.
E-03	Please add facilities to facilitate editing of significance rating scores!
T-06	Please add facilities to make it easier to set user access rights!
T-28	Please add a feature to edit the weight score!
T-48	There needs to be a feature provided in the application so that it can edit the significance rating scores.
T-53	There need to add facilities that make it easier to set master data activation.
T-60	Please provide the facilities to make it easier to set user access rights!
S-15	Please add a feature to manage master data activation!
S-35	Please add a feature to manage user access rights!
S-87	Please add the facility to edit the weights given by the experts!
S-94	Please add a feature to be able to set the significance rating!

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