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E-BOOK OF EXTENDED ABSTRACTS

SmartRankEDU 360: AN INTELLIGENT WEB PLATFORM FOR BIG DATA- ENHANCED EDUCATIONAL STRATEGY EVALUATION WITH WASPAS

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ABSTRACT

SmartRankEDU 360 is a smart site to rank and assess educational strategies using big data and multi-criteria decision-making. It tackles critical issues of engagement/knowledge retention/cognitive efficiency/accessibility balance, which is typically hard to quantify by traditional means. SmartRankEDU 360 is affordable to educators, researchers, and policy makers because it is open source, light-weight, and runnable in a browser, and it does not require installation, unlike commercial and expensive decision-support systems. The site utilises an assessment technique called the Weighted Aggregated Sum Product Assessment (WASPAS) which synthesises the Weighted Sum Model (WSM) and the Weighted Product Model (WPM) to generate effective and robust rankings. The system normalises, weights, and calculates hybrid scores and the user builds a decision matrix including strategies and criteria. The results are provided in the form of ranked alternatives and interactive plots including normalised matrices, weighted scores, and ranking graphs. It is simple and linear, reduces errors and makes evidence-based decision-making easier, and allows for flexibility in analysis.

Keywords: Educational Strategy Evaluation, WASPAS, Multi-Criteria Decision-Making, Decision Support System, Web-Based Platform.

INTRODUCTION

The need to find clear, data-driven solutions to assess teaching and learning strategies has grown with the increased attention to effective educational planning. However, the criteria educators, policymakers, and institutions tend to use are often conflicting, subjective, and lack standardised structures, which make working with them difficult. Many such difficulties result in subjective or uneven ratings, especially when ratings are done manually rather than systematically (Idris et al., 2011).

Multi-Criteria Decision-Making techniques (MCDM) including the Weighted Aggregated Sum Product Assessment (WASPAS) provide an organized method by integrating the Weighted Sum Model (WSM) and the Weighted Product Model (WPM) into a hybrid decision model. WASPAS, originally proposed by Zavadskas et al. (2014), received extensive application in engineering, management, and policy literature, and was appreciated due to its accuracy, simplicity, and transparency of alternative ranking. The key for its popular use is that it is a combination of the additive and multiplicative models and is more reliable in complex situations for decision-making (Chakraborty and Zavadskas, 2014). However, contemporary educational assessment tools are narrow in focus, primarily static, lack the interaction or free visualisation, and thus are less trusted and flexible by users (Januri et al., 2017).

To address these gaps, this paper proposes the SmartRankEDU 360, an intelligent web-based application that uses the WASPAS approach to rank education strategies. It is a system based on MCDM principles merged with interactive web technologies that provides an easy-to-use, transparent, and scalable solution to multi- dimensional educational evaluation. This project aims to create a decision system with the

WASPAS framework to evaluate educational strategies based on various criteria and compare and rank alternatives to determine the most effective strategies, improve transparency with stepwise outputs and visualizations, and inform educators, institutions, and policymakers with data-driven decisions.

RESULTS AND DISCUSSION

SmartRankEDU 360 is a web-based decision support system that was created as an interactive tool to assess the educational strategies within the WASPAS method. It is written in Python and run using Streamlit so it can be used in its entirety online via any web browser without having to install it. This feature allows teachers, scholars and policy makers to misuse the platform in any circumstances with ease. This works by first inputting the data in either an Excel or CSV format, then building a decision matrix where the user specifies the criteria and weighted them and designates them as either a benefit or a cost. This system then normalises, uses the weights and calculates hybrid scores, and combines the Weighted Sum Model and the Weighted Product Model before producing a ranked list of alternatives.

Figure 1 shows the workflow of SmartRankEDU 360 and Figure 2 shows the integrated interface showing datasets, intermediate calculations and the rankings in real time in bar charts. All the steps of the WASPAS procedure are depicted in a chronological order, which is fully transparent and methodologically clear. The site is open source and can be accessed on <https://eduranksyafi-simple.streamlit.app/>.

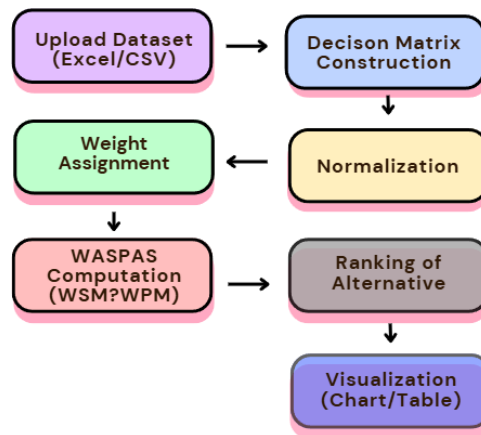


Figure 1: Workflow of SmartRankEDU 360.

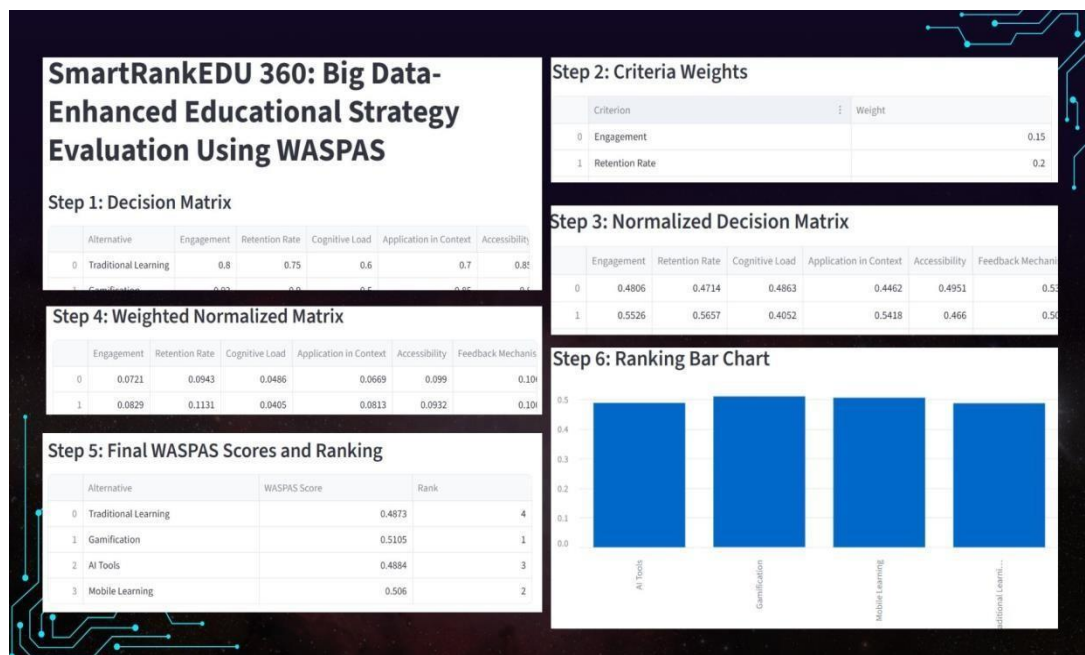


Figure 2: Ranking Visualization of Educational Strategies

SmartRankEDU 360 is unique in that it takes the academic WASPAS approach and turns it into a fully operational web platform, transparent and interactive. Unlike a traditional WASPAS calculation or a spreadsheet model that does not change, SmartRankEDU 360 allows an automated workflow that reduces mistakes and enhances productivity. All the steps involved in the WASPAS process are represented in a highly visualised way which helps build the trust of the user and provides a methodological clarity, which is lacking in traditional tools. It is very scalable because it can support large volumes of data using multiple options and restrictions and it can be used through a browser-based platform, without requiring installation and additional payment. Another feature available on the platform is flexible weight adjustments, which enables users to experiment with various decision scenarios in real-time. This interactivity and openness make SmartRankEDU 360 a unique, open system as compared to commercial decision-support systems which are more likely to be closed and exclusive. Through its scientific work and applied utility, SmartRankEDU 360 can add value to the teachers and policy makers, as well as be used as a teaching and research resource by higher education and training facilities.

CONCLUSION

SmartRankEDU 360 converts the WASPAS approach into a clear, easy to use, and flexible web-based decision support system to examine the educational strategy. It removes the errors and complexity of manually calculated processes by automating data input, normalising, weighting, and computation of hybrid scores. Its dynamism also allows the user to add weights dynamically, to visualise actions along the way and to generate clear ranking results, providing transparency and trust in the decision-making process. In contrast to a traditional spreadsheet model or an expensive commercial suite, SmartRankEDU 360 is free-of-charge, lightweight, and can process various datasets of academic, institutional, and policy scores. It also supports sound educational planning because it allows stakeholders to make informed, responsible decisions that will improve the effectiveness of teaching and learning. More MCDM techniques, more visualisations, and exportable reports could be added in the future, making it even more useful as a decision-support instrument and an educational resource.

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