

Educational Knowledge-Based System for Traffic Accident Analysis on Residential Streets: A Learning Tool for Transportation Engineering Students

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Abstract— Expert system techniques have been widely utilized in addressing traffic accidents and have demonstrated superior performance compared to shallow models. However, residential streets, particularly in low- and middle-income countries, face significant traffic safety challenges related to accidents. Therefore, this paper proposes the development of an innovative system to control traffic accidents on residential streets using expert system technology. The creation of an educational system with a knowledge base—including descriptions, causes, and solutions to traffic safety issues—provides an effective tool for Transportation Engineering students to learn about potential challenges they may encounter. This paper outlines the development and evaluation phases of the proposed system, including knowledge acquisition, knowledge representation, system construction, and testing. The evaluation results showed that the arithmetic mean for matching experts' answers with the system's outputs exceeded 4, with a Cronbach's alpha of 0.917, indicating excellent reliability. Moreover, end-user evaluations of the system revealed an overall assessment rating above 4, with a Cronbach's alpha of 0.932, further demonstrating excellent reliability.

Keywords— Educational system, Knowledge-based, Residential Street, Traffic Accident Analysis, System Building, System Evaluation.

I. INTRODUCTION (HEADING 1)

Iraq faces a severe traffic accident crisis that demands urgent attention from policymakers. In 2017, the World Health Organization (WHO) reported 600 road accidents per 100,000 people in Iraq, ranking the country third after Somalia and Sudan [1]. Iraq also recorded the highest number of fatal road accidents compared to other nations [2]. Notably, most of these accidents occurred on residential streets [3]. Traffic engineers and urban planners are increasingly addressing safety issues concerning vulnerable road users in these areas [4]. It was noted that poor road conditions are responsible for 10% of the road accidents occurring in Iraq and the lack of infrastructure pointed out the

poor maintenance of the residential streets in Iraq and the absence of safety regulations was crucially increasing the traffic accidents[5]. Determining traffic safety problems and finding appropriate solutions to tackle these problems are essential steps to control traffic accidents. The current traffic system's decision-making process lacks safety requirements such as fast cut-through, considerations for non-motorized transportation users, geometric design, public transportation, and special zones. [2]. considering the traffic safety parameters would enhance the safety of the residential streets in Iraq and reduce traffic accidents [6]. Therefore, identification and classification of the residential streets' safety problems help improve traffic accidents in the residential streets [7]. Addressing complex traffic safety issues requires engineering and technical solutions that may not be fully explained in standard traffic handbooks. The development and computerization of engineering tools can provide valuable support to engineers and decision-makers. Coping with safety problems whereby controlling and predicting traffic accidents.

Furthermore, solving traffic safety problems in residential streets requires extensive experience and skills. In Iraq, the number of professionals and experienced experts who can overcome domain problems and employ successful solutions is significantly reduced. It is attributed to the political and sectarian conflict in Iraq After 2003, the civil war led to the loss of many of Iraq's most valuable experts and elites. While many were assassinated, others fled the country in fear for their lives. These losses had a detrimental impact on Iraq's universities, representing a significant scientific loss for the nation [8]. Consequently, safeguarding the expertise of existing specialists is essential to avert potential future deficits. Iraq exhibits a deficiency in highway safety specialists, with practical expertise concentrated among a limited number of experts unevenly distributed throughout the country[3]. Many of the remaining experts work in large

companies, making it difficult for engineers to access their knowledge. Consequently, imparting domain expertise from seasoned professionals and adept engineers to beginner and less-experienced engineers is essential to avert common errors[9].

The main aim of this study is to develop a knowledge-based educational system designed especially for transportation engineering students and trainee civil engineers, concentrating on residential street situations to address probable traffic accident hazards. The system is designed to facilitate learning in managing and mitigating these problems. The paper outlines innovative systems' developmental and evaluative phases, encompassing knowledge acquisition, representation, system building, and verification/validation processes.

The preliminary stage involves acquiring knowledge through a comprehensive literature review, followed by the extraction of expert insights through interviews and questionnaires. Subsequently, the gathered knowledge undergoes documentation, analysis, representation, and transformation into computer software achieved using the Visual Basic programming language (VBPL). The system underwent verification and validation through comprehensive testing, encompassing unit testing, integration testing, and user satisfaction assessment completed via questionnaires.

II. CLASSIFICATION, KNOWLEDGE AND ELICITATION (KEC)

In the development of an intelligent system(IS), knowledge elicitation(KE) is a crucial stage [14]. Building a knowledge-based system (BKBS) involves employing detailed analytical approaches [15], a task that is both intricate and time-consuming [3,16,17]. Knowledge acquisition involves gathering information from diverse sources [18]. Initially, books, manuals, guidelines, and other written materials pertinent to the issue area are generally examined to formulate a preliminary knowledge engineering process. Additionally, domain experts provide valuable insights to further enhance the knowledge base. This acquired knowledge can be further consolidated and iteratively studied if needed [19].

This present investigation acquired foundational knowledge through an extensive examination of sources to comprehend road safety audit systems (RSAS), speed limit recommendation systems, and traffic safety expert systems, along with the challenges encountered at various stages. This knowledge underwent iterative analysis and enhancement, forming the basis for the ultimate knowledge base. The review encompasses intricate details of construction operations and associated issues, encompassing descriptions, causes, solutions to various problems, and potential consequences if these problems are left unaddressed. Following the establishment of the foundational knowledge base, expertise from domain professionals was garnered through interviews and questionnaires. Domain experts accumulate knowledge through their experiences and education in their respective fields. The selection of appropriate domain experts is a critical step, and establishing criteria ensures the extraction of the necessary expert knowledge. Two primary criteria can be applied for the selection of domain experts. The first

criterion involves the duration of work experience in the specific domain, as prolonged experience significantly enhances an expert's analytical capabilities and judgment. The second criterion considers the methods through which the expert acquired their expertise (theoretical, practical, or a combination of both) [20]. Based on these criteria, four experts were chosen for this study due to their substantial experience and expertise in dealing with traffic on residential streets. They are widely recognized and respected in this domain.

During the knowledge elicitation process, the knowledge engineer might specify the decision-making techniques utilized by experts. This can be achieved through qualitative research approaches, including conducting interviews or observing experts to elucidate latent knowledge [15]. The selection of the suitable approach is contingent upon the study's emphasis, the depth of necessary knowledge, and the resources accessible for analyzing the collected data[16]. Irrespective of the technique utilized in knowledge elicitation, the knowledge engineer endeavors to present the information to the user (whether it is a student or trainee engineer) in the clearest manner possible.

The human expertise utilized in this study was obtained from domain specialists via several methods, including unstructured interviews, structured interviews, questionnaires, and focus groups[17]. Unstructured interviews fulfilled two primary objectives. Initially, they sought to cultivate a congenial relationship with the experts, thereby streamlining the expertise elicitation process. Secondly, these interviews aimed to obtain a comprehensive understanding of the experts' practical experiences with domain-specific issues they faced. During the unstructured interviews, some issues were briefly discussed, while others were explored in greater detail. The experts shared and elucidated their practical experiences, detailing the challenges faced with traffic on residential streets and their problem-solving approaches. Although each expert was asked only a few brief questions, their comprehensive responses provided valuable insights[18]. After each unstructured interview, the gathered data was analyzed and classified. Following the refinement of the collected material, questions for structured interviews were developed, representing a crucial phase in expertise elicitation. To guarantee accurate outcomes from each structured interview, a particular facet of the domain was addressed. Since these experts do not record their experiences, the primary knowledge acquired through expertise elicitation greatly exceeded the secondary knowledge derived from literature sources[19].

The gathered knowledge was then incorporated into questionnaire forms, which were subsequently presented to three experts. Utilizing questionnaires in the knowledge elicitation process streamlined the procedure as it allowed the experts sufficient time to organize their responses. Employing questionnaires for knowledge acquisition proves efficient in terms of saving time, effort, and cost, especially when the knowledge engineer has already specified the required knowledge features [21,22]. Additionally, the design of the questionnaires facilitated the experts in individually reviewing each problem. Within the submitted questionnaires, blank spaces were provided for experts to add their comments, contributing valuable insights that

significantly enriched the knowledge base. After the examination of the responses, additional interviews (focus interviews) were carried out with the experts. This stage sought to elucidate some remarks made in their questionnaire forms and engage in in-depth talks regarding their proposed remedies to identified issues. The acquired knowledge underwent a reanalysis to achieve the final categorization[23].

A comprehensive assessment and reanalysis of the knowledge systematically grouped the domain problems according to their forms, locations, effects, and other common characteristics. This method enhances the understanding and identification of issues for students and aspiring engineers. The reasons, preventative measures, solutions, and potential impacts of many issues were delineated, offering comprehensive details to students and trainee engineers regarding domain-specific challenges. The traffic specialists engaged in this study participated in the iterative categorization phases. Three specialists, involved in focused interviews, evaluated and approved the final classification. Moreover, the final classification framework was endorsed by six specialists in transportation engineering education, comprising two assistant professors and two lecturers. They were intentionally chosen to engage in the categorization and assessment phases. Tables I,II with Figures 1,2 presents the categorized problems for reference. Trainee engineers can identify problems either visually or through tests, relying on the system's support to choose the appropriate solution. The system can pinpoint the causes of these problems, which may encompass issues like poor management, inadequately skilled staff, subpar mixture quality, adverse weather conditions, or challenging road conditions. Through repetitive utilization of the system, transportation engineering students can acquire the skills to diagnose and manage these issues effectively.

III. FUZZY INFERENCE SYSTEM

The classification issues are articulated as follows. Examining a set of separate properties that may be the focus of inquiry [17,23]:

$$P = \{P_1, P_2, \dots, P_i\} \quad (1)$$

M – Indicators that define the subjects of study from various perspectives; establish Q_m potential m-th values of the m-th feature:

$$Q_m = \{q_{m1}, q_{m2}, \dots, q_{mn}\} \quad (2)$$

And nm – the quantity of these values; the collection of all conceivable potential states of the subject under examination:

$$Q_m = \{q_{m1}, q_{m2}, \dots, q_{mn}\} \quad (2)$$

$$A = Q_1 * Q_2 * \dots * Q_{mi} \quad (3)$$

In this state $a_i \in A$ is characterized by a vector:

$$a_i = (a_{i1}, a_{i2}, \dots, a_{im}) \quad (4)$$

$$a_i \in Q_m, m = \bar{1}, \bar{M} \quad (5)$$

Hypotheses can be formally delineated as follows: Ordering characteristic values Q_m by their attributes for the property p_i enables the incorporation of transitive and antifraction binary relations (linear order) into Q_m :

$$(q_{ms}, q_{mi}) \in r_m \quad (6)$$

If QMS possesses additional attributes for this property than QMT. From these relations, a binary relation of dominance can be constructed based on characteristics for each property within the set of states about the object of investigation, as described in references [33,45]:

$$R = \{(a_s, a_i) \in A * A = \bar{1}, \bar{m}, (a_{is}, a_{im}) \notin r_m\} \quad (7)$$

$$m \in M: 1 \leq \vartheta \leq m, \quad (8)$$

a reflexive transitive relation of strict dominance is required in this case:

$$a_{s\vartheta}, a_{i\vartheta}, a_{t\vartheta} \in r_{\vartheta}. \quad b \quad (9)$$

Determine which of the attributes in the set P are important based on your expertise for each state in A, thereby constructing a classification of the set A.

$$A = U_i^k = 0^{ki} \quad (10)$$

TABLE I. RECOMMENDATIONS FOR DEALING WITH PROBLEMS RELATED TO SHARP CURVES

Strategies	Measure	Solution
Infrastructure	Street Lighting	Providing lighting for streets
Changes to the speed limit	Speed Limit Reduction	Reducing the speed limit to 30 km/h in local streets and 40 km/h in collector streets
Traffic Signs	Caution Sign	warning drivers of pedestrians and residents
	Sharp Curve Sign	Informing drivers about shape curves ahead
	Speed Limit Sign	Informing drivers about safe speed
Vertical Deflection	Speed Hump (local street)	Making slow points on roadways
	Speed Table	Making slow points on roadways
	Speed Cushion	Making slow points on roadways suitable for bus routes
	Rumble Strip	Alerting unaware drivers to the changes in traffic conditions and environment
Narrowing	Median (center Islands)	Discouraging speeding on curves and preventing drivers from overtaking on curves
Park Management	Restriction/Prohibition	Prohibiting parking for increasing sight distance



Fig 1. An example of Infrastructure strategies with street lighting measure in the software.

TABLE II. SOLUTIONS FOR CUT-THROUGH TRAFFIC

Strategies	Measures	Solution
Signing and Pavement Marking	No Thru Traffic Signs	warning drivers to enter residential streets
	Residential Traffic Signs	Informing drivers about entering residential streets
Volume Control	Full Closure	Eliminate non-local traffic from entering residential streets
	Half Closure	Blocking the movement of the wrong way from entering one-way streets
	Diagonal Diverter	block through movement from entering local streets
Vertical Deflection	Speed Hump	Making slow points to discourage thru traffic
	Speed Table	Making slow points to discourage thru traffic
	Speed Cushion	Making slow points to discourage thru traffic
Horizontal Deflection	Chicane	Making slow points to discourage thru traffic
	Lateral Shift	Making slow points to discourage thru traffic
	Central Chicane	Making slow points to discourage thru traffic
Network Analysis	Changing direction of affected street	Preventing non-local drivers from entering the streets



Fig 2 An example of Signing and pavement marking strategies with No-thru traffic signs measured in the software.

IV. SYSTEM-BUILDING PROCEDURE

This research presents an educational knowledge-based system (EKBS) meant to assist users in diagnosing problems in residential streets (RS). The depiction of acquired knowledge as rules is suitable for this system; hence, this approach was utilized to create a rule-based system. An effective method for knowledge representation in a rule-based expert system is through a data-driven forward chaining inference engine, which replicates the decision-making processes of human experts [19]. Forward chaining uses the facts in the knowledge base to infer inferences [23,14]. The inference initiates with input data and advances to outputs predicated on IF-THEN relationships. Upon the fulfillment of an IF condition in a rule within the knowledge base, the inference engine performs the actions defined in its THEN clause [24-25]. The KBS regulations emulate the rationale of human specialists in the field of study.

Rules were established utilizing the categorized knowledge to develop the software. Microsoft Visual Basic for Windows (MVBPL) was a good choice for the educational system's development because of how well it adapts to Windows and how effective it is. The responsibility of developing and maintaining the system according to the software source code generally lies with the knowledge engineer. An executable version was created for the end-users, particularly the transportation engineering students and trainee engineers. This executable version is protected from alterations. Figures 3 and 4 exhibit examples of user interfaces from the executable version.



Fig. 3 User interface for the selection of vehicle rollover accidents adopted in this research

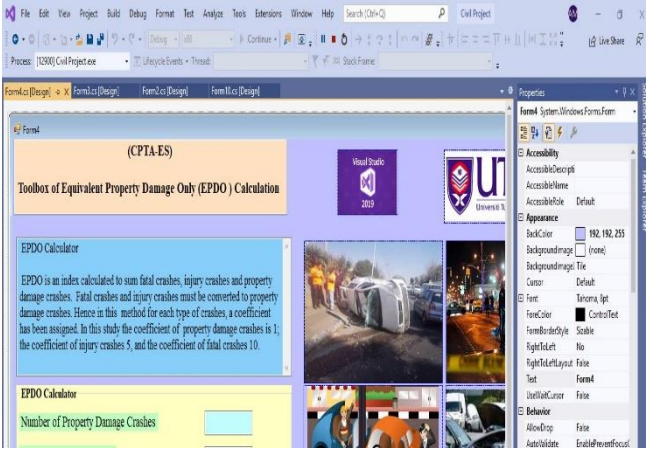


Fig. 4 Example of a textbox in this research

V. SYSTEM TESTING PROCEDURE

Important and difficult steps in the process are the validation and verification of such systems [26]. Several testing procedures need to be followed to guarantee that the right system was constructed. Throughout the system-building phase of this inquiry, unit testing and continuous integration were used for the proposed system. Using this method, the knowledge engineer was able to verify that all of the system's components worked together and were functional. The Likert scale was used as a useful measure in system evaluation that was carried out through the use of questionnaires [27, 29]. For this reason, it was used for this study. These questionnaires, which were created especially for end users, measured how satisfied they were with the system. Twenty more questionnaires were issued in addition to the six that were given to transportation engineering teaching professionals who participated in the classification procedure. Students studying transport engineering received questionnaires to complete for assessment. Users evaluated the system's performance while using it, according to the knowledge engineer's guidance. All of the comments pointed to user satisfaction, acknowledging the system's utility and effectiveness in resolving domain problems. Users also highlighted its prompt responsiveness and user-friendly interface. The system's validity can be demonstrated through a confidence level [19]. Statistical analysis was performed utilizing the Statistical Package for the Social Sciences (SPSS) version 28 to ascertain the validity and reliability of the questionnaires administered in this study phase. The arithmetic mean was calculated for statistical analysis using a notional weight value (WV) assigned to each response on the five-point Likert scale detailed in the questionnaire. The interval duration for transitioning between average arithmetic levels was computed as $(4/5 = 0.8)$, taking into account four intervals among five alternatives[11-18]. Table IV shows the value of descriptive frequencies by weight.

TABLE III. VALUE OF DESCRIPTIVE FREQUENCIES BY WEIGHT

Informative Frequency Description	The Class Interval	The Weight Value (WV)
Strongly Disagree	$1 \leq \text{Class Interval} \leq 1.8$	1
Disagree	$1.8 < \text{Class Interval} \leq 2.6$	2
Neutral	$2.6 < \text{Class Interval} \leq 3.4$	3
Agree	$3.4 < \text{Class Interval} \leq 4.2$	4
Strongly Agree	$4.2 < \text{Class Interval} \leq 5$	5

The arithmetic mean (AM) was evaluated based on the equation [22-28].:

$$AM = \frac{\sum(\text{weight Value for particular} * \text{No. of frequencies})}{\text{Total number of the answers}} \quad (11)$$

Ensuring reliability is crucial for the consistency of questionnaire results. Internal consistency (ICR) was determined through Cronbach's Alpha method, employing SPSS as the analytical tool. Cronbach's alpha provides a significant and desirable measure of internal consistency, particularly when assessing instruments measuring a single construct through multiple items. ICR values falling within the range of 0.7 to 0.9 were considered acceptable[3.8,31,32].

The alpha coefficient is frequently employed in gauging the reliability of scales, especially those utilizing a Likert scale to measure trends[18]. A high alpha value, approaching one, indicates the questionnaire's high reliability. The coefficient alpha, ranging between 0 and 1, signifies the degree of internal consistency, with a Cronbach Alpha coefficient not less than 0.70.

To assess the validity of the Likert scale questionnaire tool, the alpha coefficient was calculated using the Social Sciences Statistical Package Programme (SPSS V. 28), as per equation (12) [14-23,27].

$$\alpha = \left[\frac{k}{k-1} \right] * \left[1 - \frac{\sum s_i^2}{(\sum t)^2} \right] \quad (12)$$

where k represents the quantity of items on a scale, σ_i^2 denotes the variance of the ith item, and $\sum t^2$ signifies the variance of the total scale scores.

TABLE IV. A RULE OF THUMB FOR INTERPRETING ALPHA FOR LIKERT SCALE QUESTIONS

Cronbach Alpha	Internal Consistent Reliability
$\alpha \geq 0.9$	Excellent
$0.9 > \alpha \geq 0.8$	Good
$0.8 > \alpha \geq 0.7$	Acceptable
$0.7 > \alpha \geq 0.6$	Questionable
$0.6 > \alpha \geq 0.5$	Poor
$0.5 > \alpha$	Unacceptable

Exercise caution when applying the guidelines mentioned above. While a high alpha level may indicate a strong correlation among test items, it is essential to note that α is sensitive to the test's item count. A larger number of items can inflate α , while a smaller number of items may result in

a lower α . A high alpha might suggest redundant questions, indicating that they essentially address the same aspect. Conversely, a low alpha value could imply an insufficient number of questions on the test. The test's alpha may be improved by adding more pertinent things to it. Low test-question interrelatedness can also produce low results when testing several latent variables.

VI. SYSTEM, TESTING IN AN EDUCATIONAL SETTING PROTOCOL (STESP)

The instructional tool's usefulness was confirmed in a learning setting. To do this, twenty questionnaires were given to the teaching staff of highway engineering [32, 33, 36]. Table 5: The correlation matrix shows the correlation between every item in the questionnaire and every other item. Table 5 illustrates the points where each item corresponds with itself by placing a value of 1.000 across the diagonal (from top left to bottom right). The scores match ($r = 1$), indicating a perfect connection. After utilizing the system under the knowledge engineer's supervision, the users assessed it. Users expressed satisfaction with the system in their remarks, stating that it was useful and efficient in resolving domain-specific issues. Table 6 displays the statistical analysis of the responders. Based on user evaluations, the system was found to be user-friendly and efficient, with ratings exceeding four, as presented in Table V. Respondents expressed strong agreement with this assessment. The mean value for Question 15, which stated, 'Generally, I am satisfied with the software as an educational tool,' reflects this positive feedback was 4, indicating that the software was a suitable educational tool. Table VI shows the reliability statistics results. Cronbach's alpha was 0.96, indicating an excellent ICR. Therefore, when evaluated by three different computer professionals, transportation engineers, and educational staff, the system was verified to have excellent reliability.

TABLE V. STATISTICAL ANALYSIS OF THE RESPONDENTS IN AN EDUCATIONAL ENVIRONMENT

Item Statistics				
Questions	Mean	Std. Deviation	N	classification
The system is easy to use	4.2500	.85070	20	Strongly Agree
The system runs quickly.	4.2500	.91047	20	Strongly Agree
The user interface is user-friendly.	4.2000	.83351	20	Agree
The questions are helpful.	4.7500	.71635	20	Strongly Agree
The questions are clear.	4.4500	.68633	20	Strongly Agree
The terms are clear.	4.5000	.76089	20	Strongly Agree
The presentation of results is clear	4.3500	1.08942	20	Strongly Agree
The presentation of the results is complete.	4.2500	.85070	20	Strongly Agree
Obtaining an explanation from the system is easy.	4.2500	.91047	20	Strongly Agree

The system helps provide solutions.	4.2000	.83351	20	Agree
Strategies are well-organized	4.7000	.73270	20	Strongly Agree
Measures are well-described and designed.	4.4000	.68056	20	Strongly Agree
The system helps specify the prediction of the problem.	4.4000	.75394	20	Strongly Agree
The explanations are useful	4.3000	1.08094	20	Strongly Agree
Generally, I am satisfied with the system.	4.1000	.78807	20	Agree

TABLE VI. RELIABILITY STATISTICS RESULTS

Reliability Statistics			
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Internal consistency reliability (ICR)	N of Items
.960	.959	Excellent	15

VII. ACKNOWLEDGMENT

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VIII. LIMITATIONS AND FUTURE WORK

While this study provides a robust framework for developing a knowledge-based educational system, several limitations need to be addressed. First, the system heavily relies on input from domain experts, which might introduce subjectivity and restrict its applicability to regions with differing traffic conditions. Second, the use of static datasets limits the system's ability to adapt to dynamic traffic environments. Incorporating real-time traffic data and trajectory analysis could significantly enhance its utility. Additionally, while the system's educational focus is innovative, its real-world implementation requires further validation through pilot studies in diverse geographical and socioeconomic contexts. Finally, as the system is developed using Visual Basic, scalability and integration with modern web-based platforms may present challenges. Future research could focus on addressing these limitations to expand the system's applicability and performance.

IX. CONCLUSIONS

This study presented the development of a knowledge-based educational system tailored for diagnosing and addressing traffic accidents on residential streets, focusing on traffic engineering education. By leveraging expert insights and literature reviews, the system provides categorized knowledge encompassing descriptions, causes, solutions, and implications of traffic safety challenges. The system's evaluation revealed high reliability and user satisfaction, demonstrating its potential as a valuable educational tool for engineering students and trainees. Beyond its educational utility, the system can act as a resource for archiving

domain-specific challenges, facilitating knowledge transfer between experienced and novice engineers. However, the system is not without limitations. For instance, its current knowledge base is constrained by the availability of expert input and literature on traffic safety in low- and middle-income countries. Future iterations could expand the system's scope by incorporating real-time data and integrating predictive algorithms to simulate potential traffic scenarios.

The study contributes to the growing field of intelligent educational systems by providing a practical, user-friendly platform for learning and problem-solving. It also highlights the importance of preserving and digitizing expert knowledge to address the challenges posed by resource and skill gaps in traffic engineering, particularly in underdeveloped regions.

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TABLE V: CORRELATION MATRIX OF THE QUESTIONNAIRE

Inter-Item Correlation Matrix															
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
The system is easy to use	1.000	.798	.742	.367	.518	.691	.752	1.000	.798	.742	.296	.455	.656	.773	.903
The system runs quickly	.798	1.000	.902	.585	.569	.722	.809	.798	1.000	.902	.513	.510	.613	.775	.697
The user interface is user-friendly	.742	.902	1.000	.617	.662	.664	.730	.742	.902	1.000	.534	.594	.536	.689	.609
The questions are helpful	.367	.585	.617	1.000	.241	.338	.253	.367	.585	.617	.953	.216	.292	.238	.326
The questions are clear	.518	.569	.662	.241	1.000	.353	.623	.518	.569	.662	.178	.947	.244	.589	.399
The terms are clear	.691	.722	.664	.338	.353	1.000	.794	.691	.722	.664	.283	.305	.917	.768	.614
The presentation of results is clear	.752	.809	.730	.253	.623	.794	1.000	.752	.809	.730	.204	.582	.718	.979	.693
Presentation of results is complete	1.000	.798	.742	.367	.518	.691	.752	1.000	.798	.742	.296	.455	.656	.773	.903
Obtaining an explanation from the system is easy	.798	1.000	.902	.585	.569	.722	.809	.798	1.000	.902	.513	.510	.613	.775	.697
The system helps provide solutions	.742	.902	1.000	.617	.662	.664	.730	.742	.902	1.000	.534	.594	.536	.689	.609
Strategies are well-organized	.296	.513	.534	.953	.178	.283	.204	.296	.513	.534	1.000	.253	.324	.186	.328
Measures are well-described and designed	.455	.510	.594	.216	.947	.305	.582	.455	.510	.594	.253	1.000	.287	.544	.412
The system helps specify the prediction of the problem	.656	.613	.536	.292	.244	.917	.718	.656	.613	.536	.324	.287	1.000	.749	.638
The explanations are useful	.773	.775	.689	.238	.589	.768	.979	.773	.775	.689	.186	.544	.749	1.000	.704
Generally, I am satisfied with the system	.903	.697	.609	.326	.399	.614	.693	.903	.697	.609	.328	.412	.638	.704	1.000