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Taher. Hussein Bawi Al-zuhairi[1], Mahboubeh Sadat. Fadavi[2*], Ali. Mohan Abbood Karaghool[3], Badri. Shahtalebi[4]

1 PhD student, Department of educational management, Isf.C., Islamic Azad University, Isfahan, Iran
2 Associate Professor, Department of Educational Management, Isf.C., Islamic Azad University, Isfahan, Iran
3 Associate Professor, Faculty of Educational Sciences, Al-Mustansiriyah University, Baghdad, Iraq
4 Assistant Professor, Department of Educational Management, Isf.C., Islamic Azad University, Isfahan, Iran

Corresponding author email address:
mfadavi@iau.ac.ir

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Validation and Prioritization of the Components of the Student Responsibility Model among Iraqi Secondary School Students: A Quantitative Study Using the Delphi Technique

ABSTRACT

The aim of this article is to extract and scientifically reconstruct the quantitative phase of a dissertation in the field of education; a phase focused on validating and prioritizing the components of the student responsibility model among Iraqi secondary schools. The principal research problem concerns identifying which dimensions, components, and indicators within the Iraqi educational context can serve as valid foundations for assessing, strengthening, and policymaking regarding student responsibility. The research employed an applied descriptive-survey design using a three-round Delphi technique. The statistical population in the quantitative phase consisted of approximately 150 experts and specialists in the field of education in Iraq, from whom 20 participants were selected through purposive and judgmental sampling. Data were collected using a researcher-developed questionnaire based on the findings of the exploratory phase, which in its final version encompassed 45 indicators across four dimensions and 12 components. The validity of the instrument was confirmed at a desirable level through content and construct validity indices, while its reliability was supported by a Cronbach's alpha coefficient of 0.87, Kendall's coefficient of concordance of 0.78, composite reliability of 0.97, and an average variance extracted of 0.70. The findings demonstrated that out of 132 initial concepts, 45 indicators remained in the final model after three Delphi rounds. The dimension of "Indicators of Responsibility" ranked first with a mean score of 4.76, followed by "Strategies for Strengthening Responsibility" with a mean of 4.73, "Barriers to Responsibility" with a mean of 4.71, and "Factors Influencing Responsibility" with a mean of 4.64. At the component level, "Academic Behaviors" and "Motivational Development" achieved the highest priorities. At the indicator level, "Completing assignments on time," "Regular and punctual class attendance," "Observing laboratory safety regulations," and "Appropriate motivational development" were identified as the most important indicators. Overall, the findings indicate that the final research model provides a multidimensional framework with adequate psychometric properties for assessing and enhancing student responsibility in Iraqi schools and may serve as a basis for curriculum planning, teacher training, improved assessment systems, and school-based interventions.

Keywords: Student Responsibility, Delphi Technique, Model Validation, Iraqi Secondary Schools, Indicator Prioritization

Introduction

Responsibility is regarded as one of the fundamental educational and developmental constructs that plays a decisive role in shaping students' academic, social, moral, and behavioral competencies. In contemporary educational systems, responsibility is no longer interpreted merely as compliance with school rules or completion of academic tasks; rather, it is considered a multidimensional construct associated with self-regulation, social participation, ethical commitment, accountability, and active engagement in learning processes [1, 2]. The growing complexity of educational environments,

rapid technological transformations, changing family structures, and increasing social challenges have intensified the need to cultivate responsibility among students, particularly during adolescence and secondary education, which represent critical stages in identity formation and behavioral stabilization [3, 4]. Within this context, educational institutions are expected not only to transfer knowledge but also to foster responsible individuals capable of decision-making, cooperation, ethical reasoning, and constructive participation in society.

Educational scholars increasingly emphasize that responsibility is closely linked to academic achievement, psychological adjustment, self-efficacy, and long-term social adaptation. Students who demonstrate higher levels of responsibility tend to show stronger commitment to learning, greater persistence in academic tasks, better classroom participation, and more effective interpersonal relationships [2, 5]. Conversely, weak responsibility is often associated with academic disengagement, low motivation, behavioral problems, weak self-regulation, and reduced educational achievement [6]. From this perspective, responsibility is not only a desirable educational outcome but also a central mechanism through which educational systems can enhance school effectiveness and student development. Recent psychometric investigations have further highlighted the importance of constructing reliable and multidimensional instruments for assessing responsibility during adolescence, emphasizing that responsibility should be conceptualized through observable behaviors, social commitments, and contextual influences rather than through simplistic disciplinary indicators alone [1].

The theoretical foundations of responsibility in education are rooted in multiple intellectual traditions, including social learning theory, self-determination theory, communicative theory, moral development theory, and critical educational philosophy. Self-determination approaches argue that responsibility develops when learners experience autonomy, competence, and relatedness in educational settings [7]. Similarly, communicative theories emphasize that responsibility emerges through meaningful interaction, dialogue, and reciprocal participation between teachers and students [8]. Critical educational perspectives also highlight the importance of agency, reflective action, and social accountability in educational processes, arguing that responsibility is deeply connected to learners' capacity for conscious and ethical engagement with their social realities [9]. These theoretical perspectives collectively suggest that responsibility is neither innate nor isolated; rather, it is socially constructed, educationally reinforced, and institutionally mediated.

Teachers occupy a central role in shaping students' responsibility because classroom practices, teaching methods, behavioral expectations, and interaction patterns directly influence students' behavioral and motivational orientations. Effective teachers create educational climates characterized by fairness, participation, support, and accountability, all of which contribute to the development of responsible behavior among learners [10, 11]. Studies on teacher competencies further indicate that pedagogical effectiveness depends not only on subject-matter expertise but also on the teacher's ability to model responsibility, manage classroom interactions, and cultivate positive social norms [12, 13]. Research on classroom management styles has likewise demonstrated that supportive and participatory classroom environments significantly enhance students' self-regulation and responsibility [14]. In addition, teacher expectations, encouragement strategies, and motivational support influence students' willingness to engage actively in learning and assume responsibility for academic outcomes [15].

The role of school leadership and institutional culture is equally important in promoting student responsibility. Educational administrators and school principals contribute to responsibility development by establishing supportive policies, promoting participation, encouraging ethical conduct, and creating organized educational environments [16]. School structures that

reinforce accountability, collaborative learning, and constructive evaluation systems are more likely to produce students who internalize responsible behaviors. Conversely, weak institutional management, overcrowded classrooms, insufficient educational facilities, and inconsistent evaluation systems may undermine responsibility formation and reduce students' commitment to learning processes [3]. Educational reforms in many countries increasingly emphasize school-based interventions aimed at strengthening responsibility through collaborative learning, active teaching methods, and participatory educational cultures [17].

Family and social environments also exert substantial influence on students' responsibility development. Parents who provide emotional support, establish clear expectations, and maintain constructive communication with schools contribute significantly to the emergence of responsible behavior among adolescents [18]. Social responsibility is reinforced when students observe consistent models of accountability and ethical behavior within family and community contexts [19]. In contrast, family conflict, weak parental supervision, economic stress, and limited educational support may negatively affect students' motivation and behavioral commitment. The interaction between family, school, and peer groups therefore constitutes an essential ecological framework for understanding responsibility formation during adolescence.

The significance of responsibility became even more apparent in post-pandemic educational contexts, where disruptions in learning environments increased concerns regarding discipline, motivation, and student engagement. Researchers reported that many schools experienced difficulties in restoring students' sense of responsibility and academic discipline after the COVID-19 crisis [3]. These challenges revealed that responsibility is highly sensitive to educational continuity, institutional stability, and supportive learning environments. Consequently, contemporary educational systems increasingly seek scientifically validated frameworks capable of identifying the dimensions, indicators, and determinants of student responsibility in diverse cultural and institutional contexts.

Despite the growing body of literature on responsibility, substantial conceptual and methodological gaps remain, particularly in Arab educational contexts and specifically within Iraqi secondary schools. Much of the existing research has focused either on general educational competencies or on isolated aspects of responsibility without constructing comprehensive multidimensional models suitable for practical educational implementation [6]. Some studies have investigated the relationship between responsibility and academic achievement [5], while others have examined self-regulation strategies [20], moral intelligence [21], self-determination skills [7], or social responsibility among students with learning disabilities [22]. However, limited attention has been devoted to integrating behavioral indicators, contextual factors, strengthening strategies, and structural barriers within a unified and psychometrically validated framework.

The Iraqi educational context presents distinctive social, institutional, and developmental conditions that make the study of student responsibility particularly important. Iraqi schools have experienced prolonged educational disruptions, infrastructural challenges, and social transformations that have influenced both educational quality and student behavior. Under such circumstances, promoting responsibility among secondary school students becomes essential not only for improving academic performance but also for strengthening social cohesion, ethical commitment, and constructive citizenship. Secondary education represents a particularly critical stage because students at this level encounter increasing academic demands, broader social interactions, and more complex developmental responsibilities. Accordingly, identifying the key dimensions and indicators of responsibility in Iraqi secondary schools can provide valuable guidance for curriculum development, teacher training, educational evaluation, and school-based interventions.

Another important issue concerns the need for scientifically reliable and culturally appropriate measurement instruments. Contemporary educational research increasingly emphasizes that valid educational policymaking requires psychometrically sound tools capable of accurately assessing behavioral and social constructs [1]. Without such instruments, educational interventions may remain fragmented, subjective, or ineffective. Delphi-based model development offers an important methodological advantage in this regard because it allows expert consensus to guide the refinement and prioritization of educational indicators through systematic and iterative evaluation processes. The Delphi technique has been widely recognized as an effective strategy for extracting expert knowledge, reducing conceptual ambiguity, and developing valid educational frameworks in complex domains [23]. Through iterative consensus-building, the technique enables researchers to identify the most meaningful and practically relevant indicators while eliminating less significant or redundant components.

Furthermore, responsibility should not be understood solely as an individual behavioral trait but also as a socially and educationally constructed phenomenon shaped by institutional relationships, communication processes, and educational culture. The literature on educational communication and classroom interaction demonstrates that responsibility develops through reciprocal engagement between teachers and students, participatory teaching strategies, and meaningful learning experiences [8, 17]. Studies on teacher identity and professional competence likewise suggest that teachers' own perceptions of responsibility and ethical commitment significantly influence classroom dynamics and students' behavioral orientations [24, 25]. Similarly, contemporary educational thought increasingly stresses that effective teaching involves not only knowledge transmission but also the cultivation of character, self-accountability, and social responsibility [10, 26].

Research in mathematics didactics, educational organization, and classroom interaction further supports the argument that responsibility is strengthened when students actively participate in problem-solving, collaborative learning, and reflective educational experiences [27]. These findings align with broader educational theories emphasizing learner agency, experiential engagement, and participatory learning processes. In addition, modern approaches to educational leadership increasingly integrate concepts of ethical responsibility, strategic accountability, and responsible governance, especially in technology-rich educational systems influenced by artificial intelligence and digital transformation [4]. Such developments demonstrate that responsibility is becoming a central organizing principle across multiple levels of educational systems, from classroom practices to institutional leadership.

Given the theoretical importance of responsibility, the practical challenges faced by Iraqi schools, and the absence of comprehensive validated models appropriate for the Iraqi educational context, the present study seeks to identify, validate, and prioritize the dimensions, components, and indicators of student responsibility among Iraqi secondary school students using a three-round Delphi technique.

Methodology

In terms of purpose, this study was applied, and in terms of data collection, its quantitative section was descriptive–survey in nature and employed a three-round Delphi technique. The rationale for using the Delphi technique was that the initial indicators extracted from the previous exploratory phase could be refined through a gradual process based on expert consensus, so that ultimately only the components and indicators with high importance and strong agreement would remain in the final model.

The statistical population of the quantitative phase consisted of experts and specialists in the field of education in Iraq, estimated at approximately 150 individuals. From this population, 20 participants were selected through purposive and judgmental sampling. The inclusion criteria included having relevant educational or executive experience, specialized familiarity with school and educational issues, and the ability to participate in three Delphi rounds. The expert panel consisted of 14 experienced teachers, 4 school principals, and 2 education specialists; 55% were male and 45% were female, while 55% held a master's degree and 45% held a doctoral degree.

The main data collection instrument was a researcher-developed questionnaire designed based on the concepts identified in the previous exploratory phase. At this stage, 132 initial concepts were converted into assessable items, and then, through the refinement process, similar indicators were merged or removed. The final version of the instrument, which formed the basis of the quantitative report in the present article, covered 45 indicators within four dimensions and 12 components. The four main dimensions were indicators of responsibility, factors influencing responsibility, strategies for strengthening responsibility, and barriers to responsibility.

The Delphi process was conducted in three rounds. In the first round, 132 initial concepts were provided to the experts, and the acceptance criterion was obtaining a mean score of 3.5 or higher. In the second round, the remaining 89 factors were re-evaluated, and the criterion for retaining a factor was a mean score of 4.0 or higher and a standard deviation below 0.75. In the third round, 65 factors were assessed using a stricter criterion, namely a mean score of 4.25 or higher and a standard deviation below 0.60, and finally, 45 indicators entered the final model. This staged logic made it possible to gradually eliminate indicators that were of low importance or lacked sufficient agreement.

To establish the validity of the instrument, face validity, content validity, and construct validity were used. In the content validity assessment, the content validity ratio (CVR) was reported as 0.89 and the content validity index (CVI) as 0.92, both of which were at a desirable level. Quantitative face validity was also 4.78, and the qualitative evaluation by specialists confirmed the clarity and appropriateness of the items. In construct validity, the KMO index was 0.94, Bartlett's test was significant at $p < 0.001$, and 76.8% of the total variance was explained by the model factors.

The reliability of the instrument was also examined through several procedures. Cronbach's alpha for the whole model was 0.96, and for the four dimensions it ranged from 0.87 to 0.93. Composite reliability was 0.97 for the whole model and ranged from 0.89 to 0.95 for the dimensions. The average variance extracted was also reported to range from 0.64 to 0.73 for the dimensions and was 0.70 for the whole model. In addition, Kendall's coefficient of concordance was calculated as 0.78 to assess the degree of consensus, indicating strong agreement among the experts. The Wilcoxon test was also used to examine the stability of opinions across the rounds.

Data analysis was conducted using descriptive statistics, Kendall's coefficient of concordance, validity and reliability indices, and confirmatory factor analysis. Fit indices including χ^2/df, GFI, AGFI, CFI, NFI, IFI, RMSEA, SRMR, PNFI, and PCFI were used to examine the fit of the final model structure with the data.

Regarding ethical considerations, expert participation was voluntary, the confidentiality of responses was maintained, and the data were used only for the scientific purposes of the study. In reporting the article, an effort was also made to present the findings with research integrity and without exaggerating the inferences.

Findings and Results

The quantitative findings of the present article are reported in five main sections: characteristics of the expert sample, the process of screening indicators in the three Delphi rounds, the final structure of the model, psychometric indices, and the final prioritization of dimensions, components, and indicators.

The demographic characteristics of the panel members indicate that the composition of the experts was selected in such a way as to include both direct school-based experience and managerial and professional perspectives. The predominance of experienced teachers in the sample gave the model a more practical orientation, because the judgments were based primarily on lived professional experience in the real school environment. On the other hand, the presence of school principals and education specialists gave weight to the structural and policy-related dimensions of the model.

Table 1

Demographic Characteristics of the Delphi Panel Members

Variable	Category	Frequency	Percentage
Gender	Female	9	45.0
	Male	11	55.0
Specialized role	Experienced teacher	14	70.0
	School principal	4	20.0
	Education specialist	2	10.0
Educational degree	Master's degree	11	55.0
	Doctoral degree	9	45.0
Work experience	15–25 years	13	65.0
	More than 25 years	7	35.0
Total		20	100

Table 2

Criteria for Screening Indicators in Each Delphi Round

Delphi round	Input	Retention/Deletion criterion	Output
First round	132 initial concepts	Mean score of 3.5 or higher	89 factors accepted
Second round	89 factors	Mean score of 4.0 or higher; standard deviation below 0.75	65 factors accepted
Third round	65 factors	Mean score of 4.25 or higher; standard deviation below 0.60	45 final indicators

The three-stage Delphi process showed that as the process moved from the first round to the third round, the number of indicators decreased and expert convergence increased. In the first round, the field of judgment was broader, and 132 initial concepts were examined; however, in the subsequent rounds, only indicators that met the required threshold in terms of both importance and consensus remained. The retention of 45 indicators from among 132 initial concepts means that only 34.1% of the initial input was ultimately recognized as sufficiently adequate.

Table 3

Comparison of the Number of Factors Across the Three Delphi Steps

Stage	Number of input factors	Acceptance criterion	Accepted factors	Removed factors	Acceptance percentage
Step 1	132	Mean ≥ 3.5	89	43	67.4%
Step 2	89	Mean ≥ 4.0 and SD < 0.75	65	24	73.0%
Step 3	65	Mean ≥ 4.25 and SD < 0.60	45	20	69.2%
Final result	132	Three-stage criteria	45	87	34.1%

The increase in mean scores from the first to the third step indicates the gradual stabilization of expert judgments. For example, the indicator "family support" increased by 0.20 points, indicating the growing prominence of this factor during the

consensus process. Indicators such as “completing assignments on time” and “observing safety regulations” also had high mean scores from the beginning, yet were further strengthened in the final round. Therefore, it can be stated that throughout the Delphi process, the experts increasingly agreed on the importance of academic behaviors and supportive educational mechanisms.

Table 4

Changes in the Mean Scores of Selected Factors Across the Three Delphi Steps

Sample factors	Step 1	Step 2	Step 3	Total change
Completing assignments on time	4.85	4.90	4.95	+0.10
Regular and punctual attendance	4.75	4.85	4.90	+0.15
Appropriate motivational development	4.75	4.85	4.90	+0.15
Observing safety regulations	4.80	4.85	4.90	+0.10
Family support	4.65	4.75	4.85	+0.20
Total mean	4.52	4.67	4.70	+0.18

The final structure of the model indicates that the first dimension, namely “Indicators of Responsibility,” consists of four components: academic behaviors, classroom participation, orderliness, and laboratory behavior. The second dimension focuses on external and interactive influencing factors and encompasses the role of family, teacher, school environment, and peers. The third dimension addresses enhancement strategies, while the fourth dimension represents the barriers to the development of responsibility. This arrangement transforms the model from a unidimensional framework into a multidimensional one and provides it with diagnostic and intervention capacities.

Table 5

Operational Definition of the Dimensions of the Responsibility Model

Dimension	Operational definition in the article	Components	Range of indicators
Indicators of responsibility	Behaviors and observable manifestations of students’ commitment within the school environment	Academic behaviors; classroom participation; orderliness; laboratory behavior	12 indicators
Factors influencing responsibility	Contexts and variables affecting the development of student commitment	Family role; teacher influence; school environment; peer influence	11 indicators
Strategies for strengthening responsibility	Practical actions and strategies for fostering responsible behavior	Motivational development; assignment of responsibility; encouragement and appreciation; active teaching methods	13 indicators
Barriers to responsibility	Challenges and limitations reducing the manifestation of responsible behavior	Motivational issues; family problems; weaknesses in the educational system	9 indicators

Table 6

Dimensions, Components, and Mean Scores of the Final Model

Main dimension	Components	Factor loadings	Number of indicators	Total mean
Indicators of responsibility	Academic behaviors	0.779	4	4.86
Indicators of responsibility	Classroom participation	0.936	3	4.68
Indicators of responsibility	Orderliness	0.936	2	4.68
Indicators of responsibility	Laboratory behavior	0.396	3	4.80
Factors influencing responsibility	Family role	0.826	3	4.68
Factors influencing responsibility	Teacher influence	0.796	3	4.75
Factors influencing responsibility	School environment	0.833	3	4.63
Factors influencing responsibility	Peer influence	0.818	2	4.50
Strategies for strengthening responsibility	Motivational development	0.788	3	4.85
Strategies for strengthening responsibility	Assignment of responsibility	0.707	3	4.62
Strategies for strengthening responsibility	Encouragement and appreciation	0.757	3	4.78
Strategies for strengthening responsibility	Active teaching methods	0.757	4	4.68
Barriers to responsibility	Motivational issues	0.878	3	4.75
Barriers to responsibility	Family problems	0.739	3	4.67
Barriers to responsibility	Weaknesses in the educational system	0.752	3	4.70
Total	12 components		45 indicators	4.70

All psychometric indices of the model were within the desirable range. The high Cronbach's alpha and composite reliability values indicate the internal consistency and stability of the dimensions, while the satisfactory AVE values demonstrate the convergent adequacy of the constructs. In addition, the KMO and Bartlett results, together with the factor fit indices, indicate that the final structure is defensible not only conceptually but also statistically. Therefore, the model can serve as a basis for developing assessment instruments, conducting field studies, and designing educational programs.

Table 7

Reliability Indices of the Final Model

Main dimension	Cronbach's alpha coefficient	Composite reliability	AVE
Indicators of responsibility	0.91	0.93	0.69
Factors influencing responsibility	0.89	0.91	0.66
Strategies for strengthening responsibility	0.93	0.95	0.73
Barriers to responsibility	0.87	0.89	0.64
Overall model	0.96	0.97	0.70

Table 8

Validity Indices of the Final Model

Validity index	Obtained value	Acceptable threshold	Status
Content Validity Ratio (CVR)	0.89	>0.62	Desirable
Content Validity Index (CVI)	0.92	>0.79	Desirable
Quantitative face validity	4.78	>4.0	Desirable
Qualitative face validity	Confirmed	Confirmation	Desirable
Construct validity (factor analysis)	KMO = 0.94	>0.70	Desirable
Bartlett's test	$p < 0.001$	<0.05	Significant
Percentage of explained variance	76.8%	>60%	Desirable

Table 9

Fit Indices of the Final Model

Fit index	Calculated value	Acceptable threshold	Fit status
χ^2/df	2.31	<3	Desirable
GFI	0.91	>0.90	Desirable
AGFI	0.89	>0.85	Desirable
CFI	0.95	>0.90	Desirable
NFI	0.93	>0.90	Desirable
IFI	0.95	>0.90	Desirable
RMSEA	0.065	<0.08	Desirable
SRMR	0.048	<0.08	Desirable
PNFI	0.78	>0.50	Desirable
PCFI	0.82	>0.50	Desirable

The ranking of the dimensions indicates that the experts primarily focused on what makes responsibility visible in students' everyday behavior and subsequently on the strategies that can strengthen such behavior. The lower ranking of "influencing factors" does not imply that they are unimportant; rather, it suggests that in the experts' perspective, contextual factors are viewed more as explanatory backgrounds, whereas indicators and strategies are considered more directly applicable within schools.

Table 10

Prioritization of the Main Dimensions of the Model

Rank	Main dimension	Mean	Standard deviation	Importance coefficient
1	Indicators of responsibility	4.76	0.41	0.27
2	Strategies for strengthening responsibility	4.73	0.43	0.26
3	Barriers to responsibility	4.71	0.45	0.24
4	Factors influencing responsibility	4.64	0.49	0.23

At the component level, “academic behaviors” and “motivational development” ranked first. This finding indicates that within the educational logic of the model, responsibility manifests most strongly when it is both observable in core academic behaviors and reinforced through motivational processes. On the other hand, the component “peer influence” obtained the lowest rank, which may suggest that despite acknowledging the role of peer groups, the experts considered the influence of teachers and families to be more prominent within Iraqi schools.

Table 11

Prioritization of the Main Components of the Model

Rank	Component	Related dimension	Mean	Importance coefficient
1	Academic behaviors	Indicators of responsibility	4.86	0.089
2	Motivational development	Strengthening strategies	4.85	0.088
3	Laboratory behavior	Indicators of responsibility	4.80	0.087
4	Encouragement and appreciation	Strengthening strategies	4.78	0.086
5	Teacher influence	Influencing factors	4.75	0.085
6	Motivational issues	Barriers to responsibility	4.75	0.085
7	Weaknesses in the educational system	Barriers to responsibility	4.70	0.084
8	Classroom participation	Indicators of responsibility	4.68	0.083
9	Orderliness	Indicators of responsibility	4.68	0.083
10	Teaching methods	Strengthening strategies	4.68	0.083
11	Family role	Influencing factors	4.68	0.083
12	Family problems	Barriers to responsibility	4.67	0.082
13	School environment	Influencing factors	4.63	0.081
14	Assignment of responsibility	Strengthening strategies	4.62	0.080
15	Peer influence	Influencing factors	4.50	0.079

The analysis of the top 15 indicators demonstrates that the final model emphasizes responsibility that is both measurable and amenable to intervention. These indicators either represent fundamental learning behaviors or are directly related to the role of teachers and families in stimulating and sustaining motivation. The high importance assigned to laboratory safety regulations is also consistent with the nature of biology education and indicates that responsibility in this study was not limited merely to classroom assignments, but also extended to practical activities and workshop and laboratory environments.

Table 12

Top Fifteen Indicators of the Model

Rank	Indicator	Related component	Mean	Standard deviation
1	Completing assignments on time	Academic behaviors	4.95	0.22
2	Regular and punctual attendance in class	Academic behaviors	4.90	0.31
3	Observing laboratory safety regulations	Laboratory behavior	4.90	0.31
4	Appropriate motivational development	Motivational development	4.90	0.31
5	Preparedness for class participation	Academic behaviors	4.85	0.37
6	Family support and expectations	Family role	4.85	0.37
7	Relating lessons to real life	Motivational development	4.85	0.37
8	Timely encouragement and appreciation	Encouragement and appreciation	4.85	0.37
9	Active participation in classroom discussions	Classroom participation	4.80	0.41

10	Caring for tools and equipment	Laboratory behavior	4.80	0.41
11	Clear teacher expectations	Teacher influence	4.80	0.41
12	Using practical examples	Motivational development	4.80	0.41
13	Providing positive feedback	Encouragement and appreciation	4.80	0.41
14	Lack of motivation	Motivational issues	4.80	0.41
15	Appropriate quality of task performance	Academic behaviors	4.75	0.44

The following appendix presents the complete list of the 45 final indicators of the model. On the one hand, this table enables researchers to reproduce the instrument or design subsequent scales, and on the other hand, it provides school administrators and teachers with an operational picture of the components that can be utilized in school assessment, curriculum planning, and educational interventions.

Table 13

Complete List of the 45 Final Indicators of the Student Responsibility Model

No.	Initial concepts	Secondary concepts	Main concepts	Mean	Standard deviation
1	Completing assignments on time	Academic behaviors	Indicators of responsibility	4.95	0.22
2	Regular and punctual attendance in class	Academic behaviors	Indicators of responsibility	4.90	0.31
3	Preparedness for class participation	Academic behaviors	Indicators of responsibility	4.85	0.37
4	Appropriate quality of task performance	Academic behaviors	Indicators of responsibility	4.75	0.44
5	Active participation in classroom discussions	Classroom participation	Indicators of responsibility	4.80	0.41
6	Asking questions when concepts are not understood	Classroom participation	Indicators of responsibility	4.70	0.47
7	Helping classmates	Classroom participation	Indicators of responsibility	4.55	0.51
8	Orderliness in note-taking and notebook organization	Orderliness	Indicators of responsibility	4.60	0.50
9	Caring for books and materials	Orderliness	Indicators of responsibility	4.75	0.44
10	Observing laboratory safety regulations	Laboratory behavior	Indicators of responsibility	4.90	0.31
11	Caring for tools and equipment	Laboratory behavior	Indicators of responsibility	4.80	0.41
12	Cooperation in group experiments	Laboratory behavior	Indicators of responsibility	4.70	0.47
13	Family support and expectations	Family role	Influencing factors	4.85	0.37
14	Modeling parents' behavior	Family role	Influencing factors	4.55	0.51
15	Effective family–school communication	Family role	Influencing factors	4.65	0.49
16	Modeling teacher behavior	Teacher influence	Influencing factors	4.75	0.44
17	Clear teacher expectations	Teacher influence	Influencing factors	4.80	0.41
18	Fair teacher behavior	Teacher influence	Influencing factors	4.70	0.47
19	Appropriate educational environment	School environment	Influencing factors	4.65	0.49
20	Support from school management	School environment	Influencing factors	4.50	0.51
21	Adequate laboratory facilities	School environment	Influencing factors	4.75	0.44
22	Positive peer influence	Peer influence	Influencing factors	4.55	0.51
23	Constructive competition	Peer influence	Influencing factors	4.45	0.51
24	Appropriate motivational development	Motivational development	Strengthening strategies	4.90	0.31
25	Relating lessons to real life	Motivational development	Strengthening strategies	4.85	0.37
26	Using practical examples	Motivational development	Strengthening strategies	4.80	0.41
27	Gradual assignment of responsibility	Assignment of responsibility	Strengthening strategies	4.70	0.47
28	Creating opportunities for decision-making	Assignment of responsibility	Strengthening strategies	4.60	0.50
29	Assigning classroom roles	Assignment of responsibility	Strengthening strategies	4.55	0.51
30	Timely encouragement and appreciation	Encouragement and appreciation	Strengthening strategies	4.85	0.37
31	Identifying and introducing exemplary students	Encouragement and appreciation	Strengthening strategies	4.70	0.47
32	Providing positive feedback	Encouragement and appreciation	Strengthening strategies	4.80	0.41
33	Using active teaching methods	Active teaching methods	Strengthening strategies	4.75	0.44
34	Cooperative learning	Active teaching methods	Strengthening strategies	4.60	0.50
35	Group problem-solving	Active teaching methods	Strengthening strategies	4.65	0.49
36	Teaching problem-solving skills	Active teaching methods	Strengthening strategies	4.70	0.47
37	Lack of motivation	Motivational issues	Barriers to responsibility	4.80	0.41
38	Failure to understand the importance of the lesson	Motivational issues	Barriers to responsibility	4.75	0.44
39	Lack of self-confidence	Motivational issues	Barriers to responsibility	4.70	0.47
40	Family economic problems	Family problems	Barriers to responsibility	4.65	0.49
41	Lack of parental support	Family problems	Barriers to responsibility	4.75	0.44
42	Family tensions	Family problems	Barriers to responsibility	4.60	0.50
43	Shortage of educational facilities	Weaknesses in the educational system	Barriers to responsibility	4.70	0.47
44	Overcrowded classrooms	Weaknesses in the educational system	Barriers to responsibility	4.75	0.44
45	Weaknesses in assessment practices	Weaknesses in the educational system	Barriers to responsibility	4.65	0.49

Discussion and Conclusion

The present study aimed to validate and prioritize the dimensions, components, and indicators of student responsibility among Iraqi secondary school students using a three-round Delphi technique. The findings demonstrated that the final model possesses a multidimensional structure with acceptable psychometric adequacy and includes four principal dimensions: indicators of responsibility, factors influencing responsibility, strategies for strengthening responsibility, and barriers to responsibility. The results showed that among the four dimensions, “indicators of responsibility” obtained the highest priority, followed respectively by “strategies for strengthening responsibility,” “barriers to responsibility,” and “factors influencing responsibility.” Furthermore, among the components, “academic behaviors” and “motivational development” achieved the highest rankings, while indicators such as “completing assignments on time,” “regular and punctual attendance,” “observing laboratory safety regulations,” and “appropriate motivational development” emerged as the most important indicators in the final model.

The prioritization of observable responsibility indicators reflects the practical and behavioral orientation of the experts participating in the Delphi process. The experts appeared to define responsibility primarily through visible academic and behavioral manifestations rather than abstract personal traits. This finding is theoretically meaningful because responsibility in educational settings is often operationalized through measurable and contextually observable behaviors such as task completion, participation, punctuality, and adherence to institutional rules [1]. The strong emphasis on academic behaviors is also consistent with findings demonstrating that responsible students tend to display stronger academic engagement, higher achievement motivation, and more effective learning behaviors [2, 5]. The present results therefore reinforce the idea that responsibility is closely intertwined with everyday learning practices and cannot be separated from students’ direct engagement with educational tasks.

The high ranking of “motivational development” among strengthening strategies suggests that experts perceive responsibility as strongly dependent on internal motivational processes. This finding aligns with self-determination perspectives emphasizing that responsibility emerges when students experience autonomy, competence, and meaningful engagement in learning environments [7]. Educational environments that encourage intrinsic motivation, provide supportive feedback, and connect lessons to students’ lived experiences are more likely to foster sustainable responsibility. The importance assigned to motivational strategies in the present study is also consistent with research showing that moral intelligence development programs and self-regulation interventions significantly improve responsibility among students [20, 21]. These findings collectively indicate that responsibility should not be cultivated through coercive discipline alone but through educational processes that strengthen students’ internal commitment and sense of ownership toward learning.

The prominence of indicators such as “completing assignments on time” and “regular and punctual attendance” demonstrates that responsibility in the Iraqi secondary school context is strongly associated with discipline, consistency, and commitment to academic obligations. This finding corresponds with studies conducted after the COVID-19 pandemic, which reported increasing concerns regarding declining student discipline and weakened responsibility in educational settings [3]. The emphasis on punctuality and assignment completion may therefore reflect broader educational anxieties concerning student engagement and academic continuity in post-crisis contexts. At the same time, these findings support previous studies indicating that responsible students exhibit stronger organizational skills, better self-management, and more effective academic routines [14].

Another important finding concerns the significant role attributed to laboratory safety regulations and practical educational behaviors. The inclusion of laboratory-related responsibility among the highest-ranked indicators suggests that the experts conceptualized responsibility not merely as academic compliance but also as practical accountability within collaborative and experimental learning environments. This result is compatible with educational approaches emphasizing experiential learning, cooperative engagement, and active participation in classroom activities [17]. The importance of practical responsibility may be particularly relevant in science education, where students are expected to demonstrate awareness, caution, cooperation, and accountability in laboratory settings. Such findings suggest that responsibility in contemporary education extends beyond cognitive performance and includes behavioral competence within applied educational contexts.

The findings also highlighted the substantial influence of teachers on the development of responsibility. Components related to teacher influence, including clear expectations, fair treatment, and positive modeling, received high mean scores in the final model. This finding is strongly supported by the educational literature emphasizing that teachers play a central role in shaping students' behavioral and motivational orientations [15]. Effective teachers establish structured yet supportive classroom environments in which students learn accountability, discipline, and collaborative behavior. Similarly, studies on teacher competencies and classroom interaction have shown that educational effectiveness depends significantly on teachers' professional behaviors, communication styles, and ability to establish constructive relationships with learners [11, 25]. The current findings therefore reinforce the argument that responsibility development is deeply connected to pedagogical quality and teacher professionalism.

The role of family was also strongly represented within the final model. Indicators such as family support, parental expectations, and family–school communication were identified as important contextual influences on student responsibility. This finding is consistent with ecological and social learning perspectives arguing that students internalize responsible behavior through interaction with supportive family environments and stable social expectations [19]. Previous research has similarly emphasized that parental involvement, emotional support, and educational guidance positively affect students' commitment and self-regulatory capacities [18]. At the same time, the identification of family-related barriers such as economic problems, family tensions, and lack of parental support highlights the vulnerability of responsibility development to broader social and economic conditions.

An important aspect of the present findings concerns the relatively lower ranking of peer influence compared with teacher and family influence. Although peer relationships are widely recognized as important during adolescence, the experts participating in this study appeared to consider teachers and families more influential within the Iraqi educational context. This result may reflect the cultural and institutional characteristics of Iraqi schools, where authority structures and family expectations maintain strong influence over student behavior. It may also indicate that responsibility formation in this context remains more strongly connected to adult guidance and institutional supervision than to peer-mediated socialization processes. Nevertheless, the inclusion of peer influence within the final model confirms that responsibility is shaped through multiple social interactions rather than through isolated individual processes.

The findings related to barriers to responsibility are also theoretically and practically significant. Motivational issues, educational system weaknesses, and family problems were identified as major barriers reducing responsible behavior among students. These results are consistent with studies indicating that responsibility declines in environments characterized by

weak institutional support, ineffective educational management, overcrowded classrooms, and inadequate educational resources [3, 23]. Such barriers may weaken students' engagement with learning and reduce their sense of accountability toward educational tasks. Furthermore, the findings suggest that responsibility should not be interpreted solely as an individual moral characteristic; rather, it is deeply influenced by institutional quality, educational opportunities, and social conditions.

The strong psychometric properties of the final model constitute another important contribution of the study. The high values of Cronbach's alpha, composite reliability, AVE, KMO, and model fit indices demonstrate that the proposed framework possesses acceptable internal consistency, construct validity, and structural coherence. This finding is important because many previous studies addressing responsibility focused primarily on conceptual discussions without providing comprehensive and psychometrically validated measurement frameworks [1]. The present study therefore contributes methodologically by offering a multidimensional and empirically validated model suitable for assessment, intervention, and educational policymaking within Iraqi secondary schools.

The multidimensional nature of the model also aligns with contemporary educational theories emphasizing that responsibility is a complex construct encompassing behavioral, motivational, social, institutional, and contextual dimensions. Educational communication theories stress that responsibility develops through reciprocal interaction, dialogue, and participatory learning experiences [8]. Likewise, contemporary perspectives on educational leadership and teacher professionalism emphasize ethical commitment, accountability, and participatory educational culture as central components of effective schooling [4, 10]. The present findings support these perspectives by demonstrating that responsibility emerges from the interaction between student behaviors, institutional practices, family support, teacher competencies, and motivational processes.

The study also has implications for curriculum design and educational policy. The findings suggest that schools seeking to strengthen responsibility should focus not only on disciplinary control but also on motivational development, active teaching methods, supportive classroom climates, and collaborative school-family relationships. Active teaching approaches such as cooperative learning, group problem-solving, and experiential instruction were positively represented within the final model, supporting research emphasizing the role of participatory learning environments in developing social and personal responsibility [17]. Moreover, the emphasis on encouragement, appreciation, and positive feedback suggests that constructive reinforcement strategies may be more effective than punitive approaches in promoting responsibility among adolescents.

The findings further highlight the importance of teacher preparation and professional development. Studies on teacher competencies emphasize that educational effectiveness depends substantially on teachers' ability to organize learning environments, establish meaningful communication, and model ethical and responsible behavior [12, 13]. Consequently, teacher training programs in Iraq may benefit from incorporating responsibility-oriented pedagogical strategies, classroom management skills, and motivational teaching approaches. The importance assigned to teacher influence in the present study confirms that responsibility development cannot be separated from teacher quality and educational professionalism.

The results may also be interpreted within broader sociocultural transformations affecting educational systems. Contemporary societies increasingly demand individuals capable of ethical reasoning, self-management, collaborative participation, and adaptive decision-making. In this context, responsibility represents not only a school-based behavioral

expectation but also a broader social competence associated with citizenship, social participation, and moral accountability [9, 26]. The educational emphasis on responsibility therefore reflects wider societal concerns regarding social cohesion, ethical engagement, and the preparation of students for complex social realities.

One limitation of the present study is that the Delphi panel consisted of a relatively limited number of experts drawn primarily from the educational field in Iraq, which may reduce the generalizability of the findings to other educational contexts or cultural settings. In addition, the study relied heavily on expert judgments rather than direct behavioral observations of students, which may have introduced subjective bias into the prioritization process. Another limitation concerns the cross-sectional nature of the research, which did not allow examination of changes in responsibility over time or across developmental stages.

Future research is recommended to examine the applicability of the proposed model in different educational levels, geographical regions, and cultural environments. Comparative studies between public and private schools, urban and rural educational settings, or different academic disciplines may provide deeper understanding of contextual variations in responsibility development. Longitudinal research could also investigate how responsibility evolves over time and how educational interventions influence its development. In addition, future studies may employ structural equation modeling or experimental designs to test causal relationships among the dimensions identified in the present model.

From a practical perspective, the findings suggest that educational policymakers, school administrators, and teachers should design school-based programs focused on strengthening responsibility through motivational support, active teaching strategies, collaborative learning, and positive reinforcement systems. Schools may also benefit from strengthening family–school communication and integrating responsibility indicators into student evaluation systems. Teacher training workshops emphasizing classroom management, ethical communication, and student engagement may further contribute to cultivating responsible behavior among secondary school students.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Written consent was obtained from all participants in the study.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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