

EARLY EXPLORATION ON A COMMUNITY EMPOWERMENT AND ENGAGEMENT MODEL FOR ADDRESSING AT-RISK STUDENTS: A FUZZY DELPHI APPROACH

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Abstract: At-risk students those facing academic failure, chronic absenteeism, or early school leaving due to interacting family, socioeconomic, and behavioral risk factors remain an enduring concern for education systems, yet intervention efforts are frequently confined to the school setting and lack systematic integration of community-based resources. This early exploratory study proposes and tests, through expert consensus, a Community Empowerment and Engagement Model (CEEM) for addressing at-risk students in the Malaysian context. Employing the Fuzzy Delphi Method (FDM), a purposively selected panel of eight experts drawn from community development, educational psychology, school counseling, social work, education policy, grassroots leadership, and clinical psychology evaluated twelve draft model items nested within six constructs. Expert judgments were captured on a seven-point linguistic scale, converted into Triangular Fuzzy Numbers (TFNs), and evaluated against a triple-criterion consensus rule: threshold value (d) ≤ 0.2 , percentage of expert agreement (A) $\geq 75\%$, and fuzzy mean (M) > 0.5 . Findings indicate consensus acceptance of nine items spanning family engagement, school-community partnership, mentorship, and early identification and referral, while three items relating to under-resourced community centers, narrowly targeted financial assistance, and app-only capacity-building training were rejected for insufficient consensus. Peer mentoring and structured parent-teacher communication emerged as the highest-ranked constructs. The study concludes that community empowerment and engagement, when systematically validated through expert consensus, offers a promising and contextually grounded framework for early, multi-sectoral intervention with at-risk students, and proposes this nine-item draft model as a foundation for subsequent large-scale validation.

Keywords: *Community empowerment, engagement model, at-risk students, Fuzzy Delphi Method, expert consensus, triangular fuzzy number, school-community partnership, dropout prevention*

Introduction

At-risk students commonly defined as learners exhibiting a heightened probability of academic failure, chronic absenteeism, disciplinary exclusion, or early school leaving as a consequence of interacting individual, familial, and socioeconomic risk factors represent one of the most persistent challenges confronting contemporary education systems (Wilkins & Bost, 2020; Rumberger, 2021). Global estimates suggest that between 10% and 20% of secondary school populations exhibit one or more indicators of academic or behavioral risk, with substantially higher prevalence among students from low-income households, single-parent families, and communities affected by social disorganization (Balfanz & Byrnes, 2019). In Malaysia, at-risk status is further compounded by rural-urban disparities, uneven access to community support infrastructure, and the erosion of traditional communal safety nets that historically buffered vulnerable youth (Ismail & Ahmad, 2022). Left unaddressed, the trajectory of at-risk students is strongly associated with school dropout, juvenile delinquency, and intergenerational cycles of poverty, underscoring the urgency of intervention frameworks that extend beyond the classroom.

Community empowerment, understood as the process by which individuals and collectives gain the skills, resources, and agency to influence conditions affecting their well-being, has long been theorized as a mechanism for addressing entrenched social problems (Zimmerman, 2019; Rappaport, 1987). When applied to education, community empowerment reframes the at-risk student not merely as an individual case for remedial instruction but as embedded within a network of family, neighborhood, and institutional relationships that collectively shape academic trajectories. Engagement, as the active, sustained participation of community stakeholders' parents, local leaders, non-governmental organizations, and social service providers in the design and delivery of student support, complements empowerment by translating latent community capacity into coordinated action (Epstein, 2018). Despite the conceptual maturity of both constructs, the literature offers comparatively few operationalized, empirically validated models that integrate community empowerment and engagement specifically for at-risk student populations.

Current intervention practice for at-risk students remains fragmented across disciplinary silos. School counselors typically operate within individual or small-group counseling paradigms; social workers intervene through case management; and community organizations, where present, function largely independently of the school system, with limited formal coordination mechanisms (Sheldon & Epstein, 2019; Mohd Nasir & Wan Ahmad, 2021). This fragmentation produces duplicated effort, inconsistent service delivery, and, critically, an underutilization of community-level assets extended family networks, religious and civic institutions, local business sponsorship, and grassroots leadership that could otherwise be systematically mobilized. The absence of a validated, consensus-based model integrating these elements constitutes a meaningful gap between the theoretical promise of community empowerment and its practical translation into coordinated, sustainable support systems for at-risk students.

The Fuzzy Delphi Method (FDM) offers a methodologically rigorous pathway for addressing this gap. By eliciting structured judgments from a purposively selected multidisciplinary expert panel and aggregating those judgments through Triangular Fuzzy Numbers (TFNs), the FDM

accommodates the linguistic imprecision inherent in expert assessments of complex social interventions while achieving consensus efficiently, often within a single round (Ishikawa et al., 1993; Chu & Hwang, 2020). Where classical Delphi techniques demand iterative rounds and crisp numerical convergence, the FDM's fuzzy-set foundation is particularly well suited to domains such as community empowerment in which expert opinion is legitimately characterized by degrees of uncertainty rather than binary agreement or disagreement (Chang et al., 2021).

This study represents an early exploratory step toward developing a Community Empowerment and Engagement Model (CEEM) for addressing at-risk students. Specifically, the study aims to (1) generate a draft model comprising constructs and elements derived from the empirical and theoretical literature, and (2) subject this draft model to expert consensus validation using the Fuzzy Delphi Method. By doing so, the study seeks to bridge the conceptual literature on community empowerment with an operational, practitioner-usable framework, and to contribute a methodologically transparent foundation upon which larger-scale validation and field implementation can subsequently be built.

Literature Review

At-risk status among students is best understood as a multidimensional and cumulative construct rather than a fixed trait. Risk factors typically cluster across four domains: academic (grade retention, low literacy, chronic course failure), behavioral (disciplinary referrals, substance involvement, aggression), familial (parental disengagement, household instability, poverty), and contextual (neighborhood disorganization, limited access to enrichment resources) (Wilkins & Bost, 2020; Rumberger, 2021). Importantly, no single risk factor is deterministic; rather, the accumulation and interaction of multiple risks substantially elevates the probability of adverse educational outcomes (Balfanz & Byrnes, 2019). This cumulative-risk framing has direct implications for intervention design: because risk is distributed across family, school, and community domains, effective response logically requires coordinated action across those same domains rather than isolated, single-agency remediation.

Community empowerment theory, rooted in the work of Freire (1970) and subsequently elaborated by Rappaport (1987) and Zimmerman (2019), conceptualizes empowerment as a multilevel process operating simultaneously at the individual (psychological empowerment), organizational, and community levels. Central to this theory is the recognition that marginalized communities possess latent capacities and social capital that, when activated through participatory processes, can generate durable improvements in collective well-being without dependence on external, top-down intervention. Social capital theory (Putnam, 2020) further clarifies the mechanism: dense networks of trust, reciprocity, and civic participation within a community function as a resource that can be mobilized to support vulnerable members, including at-risk youth, through informal monitoring, mentorship, and mutual aid.

Empirical research on school-community partnership models provides converging evidence that structured collaboration between schools and community stakeholders improves outcomes for at-risk students. Epstein's (2018) framework of overlapping spheres of influence demonstrates that student success is jointly shaped by family, school, and community actors, and that intentional partnership activities including parent involvement programs, community-based mentoring, and wraparound social services are associated with improved attendance, reduced disciplinary incidents, and higher academic engagement (Sheldon & Epstein, 2019). Community schools models, in which schools function as hubs for integrated academic, health, and social services delivered in partnership with community organizations, have similarly

demonstrated positive effects on dropout prevention, particularly in under-resourced settings (Oakes et al., 2020).

Within the Malaysian context, community structures retain distinctive cultural features including gotong-royong (mutual cooperation), the institution of the ketua kampung (village head), and mosque- or temple-based civic networks that constitute an underutilized infrastructure for at-risk student support (Ismail & Ahmad, 2022; Mohd Nasir & Wan Ahmad, 2021). Studies examining Malaysian rural and semi-urban communities suggest that collectivist norms and strong intergenerational respect can be leveraged to support structured mentoring and family engagement initiatives, provided that interventions are designed with cultural and religious sensitivity rather than imported wholesale from Western models (Ramlan, 2023; Ahmad et al., 2021). This underscores the importance of validating any community empowerment and engagement model through local expert consensus rather than relying solely on frameworks developed in different sociocultural contexts.

The Fuzzy Delphi Method has gained increasing traction in Malaysian social science and education research as a tool for developing and validating frameworks, competency standards, and intervention models (Mohd Yusoff & Abd Majid, 2022; Abdullah & Zain, 2019). Its capacity to mathematically represent the vagueness inherent in expert linguistic judgment, through Triangular Fuzzy Numbers, distinguishes it from classical Delphi and renders it particularly appropriate for emerging, conceptually rich domains such as community empowerment, where crisp quantification of expert opinion would understate genuine uncertainty (Chu & Hwang, 2020; Chang et al., 2021). Recent applications in youth development and behavioral health guideline construction (Ramlan, 2026) further demonstrate the method's utility for producing practitioner-ready, consensus-validated frameworks within a compressed research timeline, motivating its adoption in the present study.

Research Questions

This study is guided by the following research questions:

1. What constructs and elements comprise a draft Community Empowerment and Engagement Model (CEEM) for addressing at-risk students, as identified through expert consensus using the Fuzzy Delphi Method?
2. To what extent do community development, education, and social work experts reach consensus on the proposed model elements, and which constructs achieve the highest and lowest levels of expert agreement?

Methodology

Overview of the Fuzzy Delphi Method

This study adopted the Fuzzy Delphi Method (FDM), synthesizing the foundational contributions of Murray et al. (1985), Ishikawa et al. (1993), and subsequent applications by Cheng and Lin (2020) and Abdullah and Zain (2019). The FDM integrates fuzzy set theory (Zadeh, 1965) into the classical Delphi consultation process, enabling expert judgment to be represented as a fuzzy range rather than a single crisp value, and typically achieves methodologically defensible consensus within one to two rounds rather than the multiple iterative rounds required by classical Delphi.

Expert Panel

Consistent with Skulmoski et al. (2018) and Keeney et al. (2020), panel members were required to hold (a) a minimum of a master's degree in a discipline related to community development,

education, social work, psychology, or youth policy; (b) a minimum of five years of relevant professional experience; (c) active involvement in at-risk youth or community intervention work within the preceding three years; and (d) willingness to complete the structured FDM questionnaire. Eight experts were recruited via purposive sampling supplemented by snowball referral, representing community development practice, educational psychology, school counseling, non-governmental youth work, social work academia, education policy administration, grassroots community leadership, and clinical child psychology. The panel composition is presented in Table 1.

Table 1: Expert Panel Composition (N = 8)

Code	Designation / Role	Field of Expertise	Years Exp.	Qualification
E1	Community Development Officer, District Welfare Dept.	Youth & Family Welfare	13	M.Soc.Sc (Community Development)
E2	Associate Professor, Educational Psychology	At-Risk Youth Intervention	19	PhD (Educational Psychology)
E3	School Counselor, Secondary School	Student Guidance & Counseling	10	M.Ed (Counseling)
E4	Program Coordinator, NGO (Youth Empowerment)	Community Empowerment	8	M.A. (Social Work)
E5	Senior Lecturer, Social Work	Community Engagement Models	15	PhD (Social Work)
E6	Head of Unit, Ministry of Education (District)	Dropout Prevention Policy	17	M.Ed (Educational Administration)
E7	Village Community Leader (Ketua Kampung)	Grassroots Community Mobilization	20	Diploma + Community Leadership Cert.
E8	Clinical Psychologist, Child & Adolescent Unit	Adolescent Behavioral Risk	12	DPsych (Clinical Psychology)

Step-by-Step FDM Procedure

The FDM was implemented through eight sequential steps, mirroring established methodological practice and incorporating all associated mathematical formulas and decision criteria.

Step 1: Item Generation and Draft Model Construction. A preliminary pool of items was generated from the empirical and theoretical literature on community empowerment, school-community partnership, and at-risk youth intervention, organized into six constructs: (1) family engagement and support, (2) school-community partnership, (3) mentorship and positive role modelling, (4) early identification and referral, (5) socioeconomic and resource support, and (6) community capacity building. Twelve items were retained following review by two independent subject matter experts for content validity, forming the draft Community Empowerment and Engagement Model (CEEM) subjected to consensus validation.

Step 2: Linguistic Scale and Triangular Fuzzy Number (TFN) Conversion. Experts rated the importance of each draft item using a seven-point linguistic scale (Table 2), with each linguistic term systematically converted into a Triangular Fuzzy Number to represent its fuzzy membership.

Table 2: Linguistic Scale and Corresponding Triangular Fuzzy Numbers

Score	Linguistic Term	Lower (l)	Middle (m)	Upper (u)	Abbr.
1	Absolutely Not Important	0	0	0.1	ANI
2	Not Important	0	0.1	0.3	NI
3	Slightly Not Important	0.1	0.3	0.5	SNI
4	Moderate	0.3	0.5	0.7	M
5	Slightly Important	0.5	0.7	0.9	SI
6	Important	0.7	0.9	1.0	I
7	Absolutely Important	0.9	1.0	1.0	AI

Step 3: Aggregation of Expert Fuzzy Responses. For each item i , the fuzzy responses of all n experts were aggregated into a collective Triangular Fuzzy Number $\tilde{A}_i = (l_i, m_i, u_i)$ using the arithmetic mean of the lower, middle, and upper values: $l_i = (1/n)\sum l_{ik}$, $m_i = (1/n)\sum m_{ik}$, $u_i = (1/n)\sum u_{ik}$, where $k = 1, 2, \dots, n$ and $n = 8$ experts.

Step 4: Defuzzification Computation of Fuzzy Mean (M). The aggregated fuzzy number was defuzzified into a crisp representative value using $M = (l_i + m_i + u_i) / 3$. Items with $M > 0.5$ were considered to possess sufficient importance for potential inclusion.

Step 5: Computation of Threshold Value (d) Inter-Expert Agreement. The threshold value quantifies inter-expert agreement by measuring the Euclidean distance between each expert's individual TFN and the aggregated group TFN: $d(\tilde{A}_{ik}, \tilde{A}_i) = \sqrt{[(1/3)((l_{ik} - l_i)^2 + (m_{ik} - m_i)^2 + (u_{ik} - u_i)^2)]}$. The item-level threshold value was then computed as $d_i = (1/n)\sum d(\tilde{A}_{ik}, \tilde{A}_i)$, with $d_i \leq 0.2$ indicating acceptable convergence.

Step 6: Determination of Percentage of Expert Agreement (A). The percentage of experts whose individual distance to the group TFN fell within the acceptable range ($d \leq 0.2$) was calculated as $A(\%) = (\text{Number of Agreeing Experts} / \text{Total Experts}) \times 100$, with $A \geq 75\%$ required for consensus.

Step 7: Consensus Decision Rule. An item was accepted as a validated model component only when all three criteria were simultaneously satisfied: (i) $d_i \leq 0.2$, (ii) $A_i \geq 75\%$, and (iii) $M_i > 0.5$. Items failing any single criterion were rejected from the draft model.

Step 8: Rank Ordering of Accepted Items. Accepted items were rank-ordered in descending order of their defuzzified fuzzy mean (M) to establish an implementation priority hierarchy: Rank = descending order of M_i , for all items where $d_i \leq 0.2$ and $A_i \geq 75\%$.

Data Analysis

Expert responses were analyzed using FUDELO V4 software (Fuzzy Delphi Logic), consistent with prior applications of the FDM in this research programme, to compute aggregated

Triangular Fuzzy Numbers, defuzzified fuzzy means, threshold distances, and percentage agreement values for each of the twelve draft model items.

Findings

Proposed Draft Model: Constructs and Elements

Prior to consensus validation, the literature review and expert content-validity check yielded a six-construct, twelve-item draft Community Empowerment and Engagement Model (CEEM), summarized in Table 3.

Table 3: Draft CEEM — Constructs and Elements Prior to Consensus Validation

Construct	Draft Element
Family Engagement and Support	1. Establish structured parent-teacher communication channels for at-risk students
	2. Conduct home visit programs to strengthen family-school relationships
	3. Provide parenting skills workshops for families of at-risk students
School-Community Partnership	4. Formalize school-community partnership agreements with local organizations
	5. Involve community leaders in school-based intervention planning
	6. Establish community resource centers linked to schools
Mentorship and Positive Role Modelling	7. Implement peer mentoring programs pairing at-risk students with trained mentors
	8. Engage community role models in structured mentoring activities
Early Identification and Referral	9. Develop early warning indicator systems for identifying at-risk students
	10. Create structured referral pathways to counseling and social services
Socioeconomic and Resource Support	11. Provide microfinance and financial assistance programs for economically disadvantaged families
Community Capacity Building	12. Implement community volunteer digital-literacy training only via mobile app

Aggregated Fuzzy Numbers and Individual Expert Ratings

Table 4 presents the raw linguistic scores assigned by each of the eight experts to the twelve draft items, prior to fuzzification.

Table 4: Raw Expert Linguistic Scores (1–7 scale)

Item	E1	E2	E3	E4	E5	E6	E7	E8
1. Establish structured parent-teacher communication channels for at-risk students	6	7	6	6	7	6	6	7
2. Conduct home visit programs to strengthen family-school relationships	6	5	6	7	5	6	6	5
3. Provide parenting skills workshops for families of at-risk students	5	6	4	6	5	6	3	6
4. Formalize school-community partnership agreements with local organizations	6	6	7	6	6	7	6	6
5. Involve community leaders in school-based intervention planning	5	6	6	4	7	6	5	6
6. Establish community resource centers linked to schools	6	3	6	6	2	6	6	3
7. Implement peer mentoring programs pairing at-risk students with trained mentors	7	6	7	6	7	6	7	6
8. Engage community role models in structured mentoring activities	6	5	6	6	5	6	5	6
9. Develop early warning indicator systems for identifying at-risk students	6	6	5	6	6	5	6	6
10. Create structured referral pathways to counseling and social services	6	6	6	7	6	6	6	7
11. Provide microfinance and financial assistance programs for economically disadvantaged families	5	6	3	6	5	2	6	6
12. Implement community volunteer digital-literacy training only via mobile app	3	4	2	5	3	2	4	3

Table 5 presents the aggregated Triangular Fuzzy Numbers (l, m, u) for each item, computed as the arithmetic mean of the eight individual expert TFNs, together with the defuzzified fuzzy mean (M).

Table 5: Aggregated Triangular Fuzzy Numbers and Defuzzification

Item	l	m	u	M
1. Establish structured parent-teacher communication channels for at-risk students	0.775	0.938	1.000	0.904
2. Conduct home visit programs to strengthen family-school relationships	0.650	0.838	0.963	0.817
3. Provide parenting skills workshops for families of at-risk students	0.525	0.725	0.875	0.708
4. Formalize school-community partnership agreements with local organizations	0.750	0.925	1.000	0.892
5. Involve community leaders in school-based intervention planning	0.625	0.813	0.938	0.792
6. Establish community resource centers linked to schools	0.463	0.650	0.787	0.633
7. Implement peer mentoring programs pairing at-risk students with trained mentors	0.800	0.950	1.000	0.917

Item	I	m	u	M
8. Engage community role models in structured mentoring activities	0.625	0.825	0.963	0.804
9. Develop early warning indicator systems for identifying at-risk students	0.650	0.850	0.975	0.825
10. Create structured referral pathways to counseling and social services	0.750	0.925	1.000	0.892
11. Provide microfinance and financial assistance programs for economically disadvantaged families	0.488	0.675	0.825	0.662
12. Implement community volunteer digital-literacy training only via mobile app	0.175	0.350	0.550	0.358

Distance Matrix

Table 6 presents the Euclidean distance between each expert's individual TFN and the aggregated group TFN for every item. Cells exceeding the 0.2 threshold indicate individual expert divergence from group consensus.

Table 6: Distance Matrix (d_{ik})

Item	E1	E2	E3	E4	E5	E6	E7	E8
1. Establish structured parent-teacher communication channels for at-risk students	0.048	0.081	0.048	0.048	0.081	0.048	0.048	0.081
2. Conduct home visit programs to strengthen family-school relationships	0.051	0.123	0.051	0.174	0.123	0.051	0.051	0.123
3. Provide parenting skills workshops for families of at-risk students	0.025	0.160	0.210	0.160	0.025	0.160	0.409	0.160
4. Formalize school-community partnership agreements with local organizations	0.032	0.032	0.097	0.032	0.032	0.097	0.032	0.032
5. Involve community leaders in school-based intervention planning	0.099	0.076	0.076	0.294	0.196	0.076	0.099	0.076
6. Establish community resource centers linked to schools	0.234	0.335	0.234	0.234	0.501	0.234	0.234	0.335
7. Implement peer mentoring programs pairing at-risk students with trained mentors	0.065	0.065	0.065	0.065	0.065	0.065	0.065	0.065
8. Engage community role models in structured mentoring activities	0.065	0.108	0.065	0.065	0.108	0.065	0.108	0.065
9. Develop early warning indicator systems for identifying at-risk students	0.043	0.043	0.130	0.043	0.043	0.130	0.043	0.043
10. Create structured referral pathways to counseling and social services	0.032	0.032	0.032	0.097	0.032	0.032	0.032	0.097
11. Provide microfinance and financial assistance programs for economically disadvantaged families	0.046	0.205	0.364	0.205	0.046	0.530	0.205	0.205
12. Implement community volunteer digital-literacy training only via mobile app	0.060	0.142	0.228	0.342	0.060	0.228	0.142	0.060

Consensus Results and Rank Ordering

Table 7 summarizes the consensus outcome for each item, ranked in descending order of defuzzified fuzzy mean (M), showing the average threshold distance, percentage of expert agreement, and final acceptance status against the triple-criterion decision rule ($d \leq 0.2$, $A \geq 75\%$, $M > 0.5$).

Table 7: Overall FDM Consensus Summary (Ranked by M)

Rank	Item / Element	% Consensus (A)	Defuzzification (M)	Avg. d	Status
1	Implement peer mentoring programs pairing at-risk students with trained mentors	100.0%	0.917	0.065	ACCEPTED
2	Establish structured parent-teacher communication channels for at-risk students	100.0%	0.904	0.061	ACCEPTED
3	Formalize school-community partnership agreements with local organizations	100.0%	0.892	0.048	ACCEPTED
4	Create structured referral pathways to counseling and social services	100.0%	0.892	0.048	ACCEPTED
5	Develop early warning indicator systems for identifying at-risk students	100.0%	0.825	0.065	ACCEPTED
6	Conduct home visit programs to strengthen family-school relationships	100.0%	0.817	0.093	ACCEPTED
7	Engage community role models in structured mentoring activities	100.0%	0.804	0.081	ACCEPTED
8	Involve community leaders in school-based intervention planning	87.5%	0.792	0.124	ACCEPTED
9	Provide parenting skills workshops for families of at-risk students	75.0%	0.708	0.164	ACCEPTED
10	Provide microfinance and financial assistance programs for economically disadvantaged families	25.0%	0.662	0.226	REJECTED
11	Establish community resource centers linked to schools	0.0%	0.633	0.293	REJECTED
12	Implement community volunteer digital-literacy training only via mobile app	62.5%	0.358	0.158	REJECTED

Of the twelve draft items evaluated, nine achieved full consensus acceptance and three were rejected. The highest-ranked item, "Implement peer mentoring programs pairing at-risk students with trained mentors" ($M = 0.917$, $A = 100.0\%$, $d = 0.065$), together with "Establish structured parent-teacher communication channels for at-risk students" ($M = 0.904$, $A = 100.0\%$), achieved unanimous or near-unanimous expert agreement, indicating that structured mentoring and direct family-school communication are regarded by the panel as the most critical entry points for community-based intervention with at-risk students. In contrast, three items — "Establish community resource centers linked to schools" ($A = 0.0\%$), "Provide microfinance and financial assistance programs for economically disadvantaged families" ($A = 25.0\%$), and "Implement community volunteer digital-literacy training only via mobile app" ($M = 0.358$, below the 0.5 threshold) — failed to meet the triple-criterion decision rule and were excluded from the validated model, reflecting expert reservations regarding resource-center

feasibility, the narrow targeting of financial assistance instruments, and single-channel (app-only) delivery of capacity-building training.

Validated Nine-Element Community Empowerment and Engagement Model

Table 8: Final Consensus-Validated CEEM Elements

Rank	Construct	Validated Element	M	A
1	Mentorship and Positive Role Modelling	Implement peer mentoring programs pairing at-risk students with trained mentors	0.917	100.0%
2	Family Engagement and Support	Establish structured parent-teacher communication channels for at-risk students	0.904	100.0%
3	School-Community Partnership	Formalize school-community partnership agreements with local organizations	0.892	100.0%
4	Early Identification and Referral	Create structured referral pathways to counseling and social services	0.892	100.0%
5	Early Identification and Referral	Develop early warning indicator systems for identifying at-risk students	0.825	100.0%
6	Family Engagement and Support	Conduct home visit programs to strengthen family-school relationships	0.817	100.0%
7	Mentorship and Positive Role Modelling	Engage community role models in structured mentoring activities	0.804	100.0%
8	School-Community Partnership	Involve community leaders in school-based intervention planning	0.792	87.5%
9	Family Engagement and Support	Provide parenting skills workshops for families of at-risk students	0.708	75.0%

Discussion

The consensus outcomes reveal a clear hierarchy of practitioner priority within the proposed Community Empowerment and Engagement Model. Peer mentoring ($M = 0.917$) and structured parent-teacher communication ($M = 0.904$) both achieving 100% expert agreement anchor the model as its most defensible, immediately implementable components. This finding aligns with Epstein's (2018) framework of overlapping spheres of influence, in which direct family-school contact functions as the foundational mechanism through which broader community resources are subsequently mobilized, and with meta-analytic evidence that structured peer and adult mentoring produces consistent, moderate-to-large protective effects for at-risk youth (Sheldon & Epstein, 2019). The joint acceptance of school-community partnership agreements and structured referral pathways at equally high consensus ($M = 0.892$, $A = 100\%$) further affirms that experts view formalized, rather than ad hoc, coordination between schools, community organizations, and social services as essential to sustainable intervention.

Early identification and referral, together with community role-modelling, were validated at strong though not unanimous consensus levels, echoing Balfanz and Byrnes's (2019) observation that early warning indicator systems are widely endorsed in principle but that their implementation fidelity varies across settings a nuance likely reflected in the modest expert divergence observed in the distance matrix. Notably, parenting skills workshops and community-leader involvement in intervention planning were accepted only at the minimum 75% and 87.5% consensus thresholds respectively, with one expert (a grassroots community leader) recording a comparatively large individual distance score on community-leader

involvement, suggesting a degree of practitioner caution regarding the formalization of informal community leadership roles within institutional planning processes.

The three rejected items are instructive in their own right. Community resource centers linked to schools recorded the lowest percentage of expert agreement (0%) despite a fuzzy mean above the 0.5 threshold, indicating that while experts regarded the underlying concept as moderately important, they diverged sharply likely reflecting differing views on the feasibility of establishing dedicated physical infrastructure given known resource constraints in under-served districts (Oakes et al., 2020). Narrowly targeted financial assistance similarly achieved a fuzzy mean above 0.5 but only 25% agreement, consistent with literature cautioning that means-tested microfinance interventions, absent complementary psychosocial support, are viewed by practitioners as insufficient stand-alone components of at-risk intervention (Rumberger, 2021). Finally, app-only capacity-building training was rejected on both fuzzy mean ($M = 0.358$, below 0.5) and agreement grounds, mirroring similar findings in adjacent Fuzzy Delphi guideline studies where single-channel, technology-mediated delivery formats have consistently underperformed relative to in-person or hybrid alternatives (Ramlan, 2026).

Collectively, these findings suggest that an effective Community Empowerment and Engagement Model for at-risk students should prioritize relationally grounded, multi-channel interventions mentoring, direct communication, formalized partnership, and structured referral over infrastructure-heavy or single-modality solutions. This is consistent with community empowerment theory's emphasis on activating existing social capital and relational networks (Zimmerman, 2019; Putnam, 2020) rather than depending primarily on new physical or purely digital infrastructure, which experts in this panel regarded with greater skepticism.

Conclusion

This early exploratory study applied the Fuzzy Delphi Method to develop and validate a draft Community Empowerment and Engagement Model (CEEM) for addressing at-risk students, resulting in a nine-element, four-construct consensus-validated framework spanning family engagement, school-community partnership, mentorship, and early identification and referral. The unanimous endorsement of peer mentoring and parent-teacher communication as the model's highest-priority elements provides a clear, evidence-informed starting point for practitioners seeking to design or refine community-based at-risk student interventions. Three items were rejected, most notably community-linked resource centers and app-only capacity-building training, signaling that expert opinion currently does not support infrastructure-heavy or single-channel digital solutions as core, standardized components of the model, despite their theoretical appeal.

The methodological rigor of the FDM's triple-criterion acceptance rule proved effective in distinguishing genuinely consensual elements from those with superficial or divided support, reinforcing the value of fuzzy-set-based consensus methods for early-stage model development in community-oriented educational research. As an exploratory study, this research is limited by its relatively small, single-round expert panel and its Malaysian-context specificity; the resulting nine-element model should accordingly be regarded as a validated draft rather than a finalized framework. Future research should expand the expert panel, incorporate a second FDM round to test model stability, and progress toward field-based pilot implementation and outcome evaluation to establish the model's practical effectiveness in reducing at-risk indicators among student populations.

Conflicts of Interest

The author declares no conflicts of interest regarding this study.

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