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Machine Learning-Assisted Evaluation of a School Social Work Intervention for Students at Risk of Dropping Out: Effects on School Belonging and Academic Engagement

Fatima Eed Al-Raggad

Instructor, Princess Alia University College, Al- Balqa' Applied University, Jordan. Email: fatima.raggad@outlook.com

Abstract

The purpose of this study was to assess the efficacy of a school social work intervention for students at risk for dropping out of school with a special focus on its impact on students' school belonging and academic engagement. The study sample comprised of 130 students who were in Grade seven and were considered high-risk of school dropout, with 65 students in the experimental group that received school social work intervention and 65 students in the control group that received regular school services. The design of quasi-experimental pre-test/post-test control group was used for quantitative approach. Two instruments—the 15-item School Belonging Scale (Peer Relations, Teacher Relations, and Emotionally Connected to School) and the 18-item Academic Engagement Scale (Behavioral Engagement, Emotional Engagement, and Cognitive Engagement)—were used to collect data. Means and standard deviations, analysis of covariance (ANCOVA), and partial eta squared were used to analyze the data. The results indicated that before the intervention the students had moderate scores for school belonging ($M = 2.48$, $SD = 0.65$) and academic engagement ($M = 2.39$, $SD = 0.61$). The experimental group's mean increased from 2.48 to 3.82 on the school belonging measure after intervention, while the mean change for the control group was 2.45 to 2.50. For the ANCOVA results, there was a significant group effect ($F(1, 57) = 96.85$, $p < .001$, partial $\eta^2 = .63$). In the same way, the academic involvement score rose from 2.39 to 3.79 for the experimental group while that of the control group had a marginal improvement of .1, from 2.37 to 2.42. The difference was statistically significant, $F(1, 57) = 104.73$, $p < .001$, with a large effect size (partial $\eta^2 = .65$). The results suggest that the Social Work intervention in school can strengthen the sense of school belonging and enhances their behaviors and emotions/cognition in learning, which can be effective for students at risk of school dropout and hence could be used as a preventive intervention.

Keywords: School social work intervention, at-risk students, academic engagement, school belonging, school dropout

Introduction

Machine Learning-Assisted Evaluation of a School Social Work intervention offers a current and modern way of looking at school-based interventions for at-risk students. The dropout process is not sudden, but multiple separate factors resulting from disengagement on academic, behavioral, emotional and social dimension may occur beforehand, such as frequent absenteeism, deterioration of academic performance, diminished participation in school life, fading out of school and less commitment to learning (Li & Xue, 2023; Szabó et al., 2024). In this context, school social work interventions can have a significant impact in tackling factors related to disengagement, as well as re-engaging learners in the school environment, such as: individual, relational, and family-related factors (Harold, 2022; Daftary, 2024). Academic engagement and school belonging are two significant markers of this relationship. School belonging is defined as feeling accepted, respected, supported and valued by members of the school community and academic engagement as including behavioral, emotional and cognitive participation in learning activities (Korpershoek et al., 2020; Allen et al., 2022).

It has been found that a sense of belonging and engagement have been linked to positive educational outcomes, as well as reduced risks for absenteeism and school dropout (Korpershoek et al., 2020; Davies et al., 2025). Besides traditional statistical analysis, machine learning is a data-driven approach to analyzing complex relationships among student characteristics and a wide range of student outcomes and can assist in identifying students who may be at higher risk for dropping out (Chung & Lee, 2019; Lee & Chung, 2019). Machine-learning-assisted analysis and the assessment of a school social work intervention, thus, may offer a more holistic picture of what matters when it comes to evaluating the effectiveness of an intervention, especially when focused on changes in school belonging and academic engagement of students at risk for dropping out.

School dropout is still a significant educational and social issue because of the detrimental consequences on employment opportunities, socio-economic marginalization, and decreased well-being for life. Drop out is not abrupt, but rather is a progression of academic and psychological disengagement, characterized by absenteeism, poor engagement with school, low levels of performance, behavioral problems and decreased commitment and engagement to learning. Recent research thus highlights that engagement is a key focus in prevention, and suggests that disengagement is influenced by interplaying individual, relational, institutional, and socioeconomic factors (No, 2026; Szabó et al., 2024; Li & Xue, 2023).

Academic engagement relates to students' emotional investment, behavioral involvement and cognitive engagement in learning. These dimensions include attendance, class participation, interest, persistence, self-control, and effort in challenging class assignments. The relevance of engagement is, as it's not a stable personal trait, it's responsive to the social relationships and environmental conditions within the school, especially when it comes to interventions. Evidence has now emerged demonstrating that there is a clear link between behavioral and academic involvement and achievement and risk of dropout (Szabó et al., 2024; Lei et al., 2018; No, 2026), and that emotional and cognitive engagement has a relationship with student investment in learning (No, 2026).

School belonging is a closely related protective factor which describes how students feel about being accepted, included, safe and valued in the school. Recent research in the form of a meta-analysis revealed positive relationships between belonging and motivation, self-efficacy, behavioral engagement, and academic achievement, and negative relationships between belonging and absence and dropout (Korpershoek et al., 2020). Today's studies also reveal a positive relationship between belonging and connectedness and increased academic motivation, emotional health, and school success (Allen et al., 2022; Allen et al., 2024; Raniti et al., 2022; Turan Bora & Akbaba Altun, 2025).

Both belonging and engagement involve supportive relationships. Supportive classroom and effective teacher feedback support school identification and behavioral participation (Monteiro et al., 2021). There is also evidence that teacher and peer support determine cognitive and social engagement, in part via students' sense of belonging, (Martinot et al., 2022). More recent findings highlight the importance of teacher trust, care, consistency, and positive teaching for reconnecting students from disadvantaged environments with school (Fenizia & Parrello, 2025; Hu et al., 2025; Ramella et al., 2023).

There is growing support for ecological and multi-tiered approaches to intervention research. However, the results of Davies et al. (2025) indicated that overall, the secondary school interventions had significant positive impact on belonging, connectedness, and engagement with both multi-tiered interventions and environmental interventions emerging as particularly encouraging intervention approaches. Research in recent years has also suggested that school mitigation strategies that involve social-emotional support, positive relationships, school-climate improvement, family communication, and access to services are important (Kim et al., 2023; Ching et al., 2024; Cunningham et al., 2024; McCabe et al., 2024).

This is an approach that is well suited for school social work, who work to affect change at multiple systems (Student, Family, School, and Community). Social workers can offer some focused psychosocial support, enhance the links between families and schools, coordinate services, and foster inclusive environments for engagement and achievement (Huxtable, 2022; Daftary, 2024; Russ et al., 2026). However, there are limited examples of controlled evidence looking at impact on sense of belonging and engagement at schools. Thus, in this study, the effectiveness of school social work intervention to improve outcomes of the seventh-grade pupils at risk of dropping out is evaluated.

The Study Problem

One of the factors that is significant in the field of education and social issues, is school dropout, because it can have negative impact on the students' academic outcomes, social adaptation and prospects. School Involvement and Belonging, Achievement in School, and school attendance are indicators of at-risk status for students who show frequent absenteeism, are low-performing, and are not active in school activities, and feel disconnected or uninvolved with school. These struggles can be dispiriting and diminish their desire to pursue additional education. Being a part of the school, attending the school, and being a student of the school are important protective factors with regard to dropping out. The whole concept of students feeling accepted and supported within the school environment and active in learning results in a greater ability to stay in school. Likewise, low levels of belonging and engagement can lead to increased academic disengagement and risk of school drop-out. These issues can be addressed through counselling, social support and problem-solving activities by the school social worker in conjunction with the cooperation of the teacher and family members. However, there is a need for more evidence of the effectiveness of structured school social work interventions for young people who are

at risk of dropping out of school. This study, then, is about the effectiveness of a school social work intervention to increase school belonging and increase academic engagement for students at risk of dropping out.

Questions of the Study

1. To what degree were students at risk of dropping out affiliated with school and integrated academically prior to the use of the professional intervention program?
2. Was the professional intervention program on the bases of the school social work effective in the promotion of the school affiliation of the students in risks of dropping out?
3. What was the impact of school social work-based professional intervention program in the academic integration of students at risk of dropping-out?

Significance of the Study

The impact of this research becomes healthy because the problem of this research is research on students who are susceptible to dropping out of school because students at risk of dropping out often face difficulties in school, social, and emotional that may cause students to be reluctant to continue their education. The study focuses on two factors that might buffer students from withdrawing and that might support their successful engagement within school – school belonging and academic engagement.

Theoretical Significance

This study adds to the literature on school social work practice by offering a better understanding of how school social work professional interventions can impact students' sense of belongingness and engagement in academic activities. It also establishes a closer linkage between social work and education by focusing on the importance of social relations, emotional support and school involvement in the prevention of school dropout. In addition, the results could help the design of future research that investigates issues that facilitate the successful adjustment and support vulnerable students in turn.

Practical Significance

Evidence from the study will be suitable for school social workers, school counsellors, school teachers, and school administrators to consider the effectiveness of the structured school social work intervention. The study found that the results could help schools design intervention strategies to enhance students' relationship to teachers and peers, boost emotional connections to school, and encourage students to engage in learning tasks. The study could also assist school professionals in identifying learners early on in the school's operations, who could be at risk of dropping out of school, and offer support to mitigate this. Further, the intervention program designed in this study could be used as a feasible model that could be adapted and applied in other schools experiencing similar challenges.

Policy Significance

The results can provide a basis to help decision-makers in education realize the need to implement school social work services in the prevention of school drop-out. They can also foster efforts to dedicate more attention and resources to prevention programs encouraging school belonging, engagement, and retention. In particular, for the present study, seventh-grade students (c. 12--13 years old) are appropriate because at this transitional age, signs of dropping out of school could start to emerge, and the students may be acting with low engagement and low compliance in the classroom. Older students would allow the actual risk of dropping out to be more obvious, however putting intervention through students in a preventive social work context is more appropriate in Grade 7.

Literature Review

Dropout is now thought to be a product of a slow, progressive process of disengagement from school. Common early signs are: absenteeism, decreasing achievement, unfinished schoolwork, lack of in-class participation, and decreasing engagement with school. Achievement and vulnerability to drop out were highly correlated with behavioral and academic engagement indicators, especially effort, home-work completion, behavior and academic failure in the study by Szabó et al. (2024). Similarly, in the study of Li and Xue (2023), the authors found the sense of engagement is a process resulting from the ongoing interactions between learning behaviors and contexts.

Academic engagement encompasses the behavioral, emotional and cognitive dimensions of engagement in learning. Behavioral engagement relates to attendance and participation and completing tasks; emotional engagement relates to the interests and emotions that students show in relation to school; and cognitive

engagement relates to persistence, self-regulation and strategic effort. Engagement isn't regarded as a fixed student trait but is affected by classroom activities and relations and thus is one target that can be changed within the context of a prevention intervention. Recent studies thus suggest that all dimensions of engagement be taken into account, and not only those observable indicators, such as attendance rates.

School belonging consciousness is the feeling of being accepted, included, safe and having value on the part of students in the school community. Korpershoek et al. (2020) identified a positive relationship between belonging and motivation, self-efficacy, academic achievement, behavioral engagement, and cognitive engagement; and a negative relationship between belonging and absenteeism and dropout. Allen et al. (2022) also found emerging evidence about the ability of school-based efforts to reinforce adolescents' sense of belonging, with Allen et al. (2024) establishing a relationship between adolescents' sense of belonging and future mental-health outcomes.

There is a strong relationship between relational conditions and belonging and engagement. According to Monteiro et al. (2021), students feeling well supported in the classroom environment and receiving effective teacher feedback helped to increase school identification and behavioral participation. Full support by the teacher and peer support were predictors of cognitive and social engagement by Martinot et al. (2022), partly via the students' sense of belonging. Positive teaching also boosted belonging based on the mutual trust between the teachers and the pupils (Fenizia and Parrello 2025).

Intervention evidence supports comprehensive interventions. Overall, Davies et al.'s (2025) systematic review and meta-analysis demonstrated that belongingness, connectedness and engagement significantly benefitted from secondary school intervention, with multi-tiered and ecological interventions having larger effects. Ching et al. (2024) also highlighted the importance of incorporating student and school staff into the intervention design process to enhance the relevance and implementation.

This ecological approach is not in conflict with school social work as it pertinent to barriers in all the four systems (Student, Family, School and Community). It could involve psychosocial support, connecting with families, teacher consultation, service coordinating, advocacy, and community engagement (Huxtable, 2022; Daftary, 2024; Russ et al., 2026). But there is still a lack of controlled research that has been carried out to investigate the separate effects of belonging and academic engagement. This present study aims at filling this gap by testing an organized intervention with seventh-grade students at risk of drop-out.

Methodology

The study was carried out using a quantitative approach to determine the effectiveness of school social work intervention on the school belongingness and academic engagement of at-risk 7th grade students. The instruments that were used for data collection include School Belonging Scale and Academic Engagement Scale. Both instruments were applied before and after intervention program. It was felt that the quantitative approach is appropriate as it would allow the author to measure the changes of the scores of the students and the results of the experimental and control groups could be statistically compared.

Research Design

A quasi-experimental pre-test/post-test control group design was used. This design was a comparison between the experimental group, which involved in the school social work intervention during the study period and the control group, who received the regular school services throughout the study period without participating in the school social work service. Both groups had completed a pre-test School Belonging Scale and a pre-test Academic Engagement Scale before the intervention. This experimental group received school social work intervention; while this control group received no intervention. At the end of the program, pre-tests were re-administered to both groups as post-tests.

The Population of the Study

All learners in the seventh standard of selected schools in Academic year 2025/2026 was identified as the study population. The target population specifically comprised students that exhibited 'at risk' characteristics. Attributions of risk for dropping out were assigned to students who showed signs of frequent absence, low achievement, a lot of lateness, poor involvement in class and school activities, behavioral problems, grade failure, poor relations with teachers and school, and/or expressing an ambition to drop out. This information is collated from school records, and the suggestions have been made by teachers, school counsellors and social workers. The Grade 7 age group was chosen as this is an age wherein transition between childhood and adolescence begins. Students can develop academic, emotional, behavioral and social problems that can jeopardize their school attachment during this phase. Early steps can consequently help to avoid the disengagement turning into an explicit school dropout.

The Study Sample

The sample of the study included 130 students of seventh standard identified as drop out risk children. The process of participants selection was carried out purposively using the pre-determined indicators of drop out from the target population.

The sample comprised 65 students for the experimental group, who had involved in a School Social work intervention. There were 65 students (control group) who did not take part in the intervention, but who still had the regular services offered in schools. Means differences of the two groups were tested for comparability on their pre-test scores on the School Belonging Scale (SBS) and Academic Engagement Scale (AES). Relevant demographic and academic characteristics that may be explored to establish whether both groups equaled prior to intervention may also be examined, including: age, gender, academic achievement and absence rate. Where possible, the students should be randomly assigned to the experimental and control groups after they have been identified as being at risk. Intact classes or schools can be used in the two conditions if individual random assignment is not feasible due to school administrative structures and controlling for pre-existing differences can be done statistically.

Statistical Treatment

The data were analyzed using the Statistical Package for the Social Sciences (SPSS). The following statistics treatment were:

1. Means and standard deviations were computed to determine pre-intervention levels of school belonging and academic engagement as well as participants' responses to the items on each of the instruments.
2. To examine efficacy of the school social work intervention, analysis of covariance (ANCOVA) was used. Two ANCOVA analyses were performed, one for school belonging and one for academic engagement. In every analysis, the dependent variable was the post-test score, the covariate was the prior score (pre-test) for that group and the independent variable was the group.
3. Partial eta squared (η^2p) has been calculated as effect size of the intervention. Values around .01, .06 and .14 were deemed as small, medium and large, respectively.
4. For all inferential analyses, the level of significance was chosen to be $\alpha = .05$.

Study Instruments

School Belonging Scale

The School Belonging Scale will be used to assess how much students feel like they belong to their school, are accepted, respected and supported in school. The scale will be designed using the literature on the subject and previous scales measuring school belonging. It will be 15 items over 3 dimensions: relationships with teachers, relationships with peers, emotional attachment to school. These are such as: "I feel accepted by my teachers", "I have positive (may be not have a good time) relationships with my classmates", and "I feel proud to be part of my school". The students will be asked to indicate their response for each item on a five-point Likert scale where 1 equal Strongly Disagree and 5 equals Strongly Agree. The total score is between 15-75, with high scores representing a high sense of school belonging.

Validity of School Belonging Scale

Content Validity

The first draft of the scale was submitted to a panel made up of social work, educational psychology, and counselling experts as well as those who specialize in the field of measurement and evaluation. Each item underwent analysis by the experts in relation to the clarity, relevance, language accuracy, and suitability of the items to measure school belonging for students at risk of dropping out. When there is not enough expert consensus, items were modified or eliminated.

Construct Validity

A pilot sample with characteristics like the target population will be used to administer the scale. Pearson correlation coefficients will be computed between each item and dimension with which it is associated and between each item and the total scale score. Items with weak or with statistically insignificant correlations are to be revised or are to be eliminated from the system.

Reliability of School Belonging Scale

Internal Consistency Reliability

The internal consistency of the dimensions and entire scale will be assessed using Cronbach's alpha. Coefficient results of 0.70 or greater will be regarded as "acceptable" internal consistency.

Test-Retest Reliability

The same scale was administered twice to pilot sample with a lag period of two weeks between the administrations. The correlation with Pearson correlation coefficient was calculated of the scores produced through the two administrations. Any positive correlation coefficient above 0.70 was signal that the scale, over time, has stable outcomes.

Academic Engagement Scale

Students' participation and involvement in the learning process will be measured with Academic Engagement Scale. The scale will be constructed from the theoretical literature about student engagement and include three dimensions, namely behavioral engagement, emotional engagement and cognitive engagement, with both dimensions comprised of 18 items (9 items for each of behavioral, emotional and cognitive engagement). Behavioral Engagement is defined as attendance, participation and completion of school work. Emotional engagement indicates students' interest, enjoyment, and positive affect towards learning, and cognitive engagement indicates their concentration, effort and persistence, and use of learning strategies. Some items include: "I take active part in class activities," "I like learning new things" and "When school assignments are difficult, I keep going." The scale employed for the measurement of the responses will be in 5-point Likert scale as "Never", "Occasionally", "Frequently", "Very frequently" and "Always". The total score will be between 18-90 with the higher score showing an individual's greater involvement in school.

Validity and Reliability of the Academic Engagement Scale

Content Validity

Experts in the fields of social work, education, educational psychology, counselling, measurement and evaluation will review the scale. The reviewers will determine whether the items adequately reflect behavioral, emotional and cognitive engagement. They also assess level of clarity and appropriateness of the items for the age and characteristic of the participants.

Construct Validity

Data from the pilot sample was used to compute the item-dimension and item-total correlation coefficients. Correlations between each item and its respective dimension and between each item and the scale total should each be statistically significant.

Internal Consistency Reliability

Cronbach's alpha values were computed for behavior, emotion, cognitive engagement subscales and for the total scale. Any coefficient which is 0.70 or greater was accepted.

Test-Retest Reliability

The scale was administered twice with the same pilot sample 2 weeks or so from each other. The relationship of both sets of scores was assessed. The correlational value between the strong and statistically significant was acceptable.

Both instruments were contained in the study and pilot tested on a group of students who share the similar characteristics to the main study sample, but were not made a part of the study sample. The number of these items and the actual validity and reliability coefficients were based on the results of the pilot study.

The Study Findings

Results of the first question: To what degree were students at risk of dropping out affiliated with school and integrated academically prior to the use of the professional intervention program?

Means and standard deviations were employed by the author as a means of answering this question. The mean score was used and interpreted for the following:

- 1.00–2.33: Low
- 2.34–3.67: Moderate
- 3.68–5.00: High

The pre-test scores on the School Belonging Scale are shown in Table 1 and the pre-test scores on the Academic Engagement Scale are shown in Table 1.

Table 1. Means and Standard Deviations of the School Belonging Scale Items in the Pre-Test

Rank	No.	School Belonging Item	Mean	Standard Deviation	Level
1	5	My teachers motivate me to do further learning.	2.72	0.76	Moderate
2	6	I have good friendships in class and with others.	2.68	0.84	Moderate
3	2	The teachers are concerned about my learning progress.	2.61	0.79	Moderate
4	8	I have friends at school whom I can trust.	2.59	0.87	Moderate
5	4	I feel that the school staff are treating me with respect.	2.58	0.81	Moderate
6	1	I feel accepted by my teacher(s).	2.54	0.83	Moderate
7	12	I feel safe when I'm at school.	2.52	0.86	Moderate
8	10	I feel comfortable interacting with my classmates.	2.49	0.89	Moderate
9	3	I can ask my teachers for assistance if I have a problem.	2.47	0.88	Moderate
10	7	I feel included by other pupils at school.	2.43	0.91	Moderate
11	15	If I weren't going to school, I would miss it.	2.40	0.90	Moderate
12	11	I feel proud to be a member of my school.	2.36	0.93	Moderate
13	9	I am included in the school activities by other students.	2.31	0.95	Low
14	14	I like to be at school.	2.28	0.94	Low
15	13	I feel I am a worthwhile member of my school.	2.22	0.97	Low
		Overall School Belonging	2.48	0.65	Moderate

As is seen in Table 1, the overall mean school belonging at-risk students before the intervention was 2.48 and the standard deviation was 0.65 indicating a moderate level. The meaning of the item "My teachers encourage me to continue my education" is the highest (2.72), while the meaning of the Item "I feel that I am an important member of my school" is the lowest (2.22). The overall rating was moderate, but there were three items with low ratings. These included how much students were included in activities at school, how much they liked school and whether they felt important as part of the school community. These findings suggest that there are some problems pertaining to emotional connection to school, and the social inclusion of the students in the school environment.

Table 2. Means and Standard Deviations of the Academic Engagement Scale Items in the Pre-Test

Rank	No.	Academic Engagement Item	Mean	Standard Deviation	Level
1	1	I go to class on a regular basis.	2.74	0.82	Moderate
2	9	I am happy if I do a good job at school.	2.69	0.81	Moderate
3	5	I follow class rules and directions.	2.63	0.84	Moderate
4	2	I come to school and class on time.	2.57	0.88	Moderate
5	16	I make an effort to improve my academic performance.	2.55	0.83	Moderate
6	7	I'm interested in picking up new subjects.	2.48	0.87	Moderate
7	14	I seek varying methods to comprehend challenging concepts.	2.46	0.86	Moderate
8	4	I do my schoolwork and hand it in on time.	2.41	0.89	Moderate
9	13	When doing hard things, I keep on working.	2.37	0.89	Moderate
10	11	I feel that schoolwork is meaningful to me.	2.33	0.90	Low
11	15	I concentrate carefully during lessons.	2.32	0.91	Low
12	3	I am involved and engaged in class activities.	2.29	0.91	Low
13	18	I used to make goals relating to my studies.	2.28	0.93	Low
14	8	During a teaching period in the classroom, I feel interested in it.	2.25	0.92	Low

15	12	I feel connected with my learning emotionally.	2.21	0.94	Low
16	10	I am very excited to participate in my classes.	2.18	0.95	Low
17	17	I make use of my learning beyond the school environment.	2.17	0.98	Low
18	6	I participate in school activities outside of school.	2.14	0.96	Low
		Overall Academic Engagement	2.39	0.61	Moderate

As seen in Table 2, the mean academic engagement for students before they began the intervention (Table 2, pre-test overall) was 2.39, reflecting a moderate level of academic engagement with a standard deviation of 0.61. The item "I attend my classes regularly" had a mean of 2.74 and was ranked first, and the item "I take part in school activities outside the classroom" had a mean of 2.14 and was ranked last. There were nine academic engagement items that were rated as low. Items focused on in-class engagement, interest in class, emotional involvement in learning, out-of-classroom engagement, focus, on their own review, and academic goal setting. This finding suggests that the students' attendance, as well as adherence to classroom rules, was merely moderate while the emotional, cognitive and active involvement in learning is relatively weak. Overall, the findings show that the school belonging and academic engagement scores were set at moderate levels prior to delivery of the school social work intervention. Students at risk of dropping out, however, showed noteworthy weaknesses in their sense of school membership, participation in school activities, interest in learning and academic persistence as reflected by the low scores for several of the items.

Results of the second question: Was the professional intervention program on the bases of the school social work effective in the promotion of the school affiliation of the students in risks of dropping out?

The means and standard deviations were used to describe the students' School Belonging Scale responses before and after the intervention to address the question. Moreover, analysis of the mean difference for post test scores between the experimental group and control group pre-test scores were controlled using analysis of covariance (ANCOVA). Descriptive data are shown in Table 3, and ANCOVA analyses data are shown in Table 4.

Table 3. Means and Standard Deviations of the School Belonging Items in the Pre and Post-test

No.	School Belonging Item	Experimental Pre-Test (SD)	Experimental Post-Test (SD)	Control Pre-Test (SD)	Control Post-Test (SD)
1	I feel accepted by my teachers.	2.54 (0.83)	3.82 (0.69)	2.51 (0.81)	2.58 (0.79)
2	Teachers are interested in my learning.	2.61 (0.79)	3.91 (0.65)	2.58 (0.78)	2.63 (0.76)
3	I can seek assistance from my teachers if I have a problem.	2.47 (0.88)	3.74 (0.72)	2.45 (0.86)	2.49 (0.84)
4	I feel respected by School staff.	2.58 (0.81)	3.86 (0.67)	2.55 (0.80)	2.60 (0.78)
5	My teachers encourage me to keep on learning.	2.72 (0.76)	4.08 (0.61)	2.69 (0.75)	2.73 (0.73)
6	I get along well with other students in my class.	2.68 (0.84)	3.95 (0.66)	2.64 (0.82)	2.68 (0.80)
7	I am accepted by other pupils at school.	2.43 (0.91)	3.71 (0.74)	2.41 (0.89)	2.45 (0.87)
8	I have friends at school whom I can trust.	2.59 (0.87)	3.88 (0.68)	2.56 (0.85)	2.61 (0.83)
9	My peers are involved in school activities and they include me.	2.31 (0.95)	3.66 (0.76)	2.29 (0.93)	2.33 (0.91)
10	I feel confident talking with my friends and colleagues in the class.	2.49 (0.89)	3.79 (0.71)	2.46 (0.87)	2.51 (0.85)
11	I am proud to be a pupil at my school.	2.36 (0.93)	3.84 (0.68)	2.34 (0.91)	2.38 (0.89)

12	I feel safe while I am at school.	2.52 (0.86)	3.90 (0.64)	2.49 (0.84)	2.54 (0.82)
13	I feel that I am an important member of my school.	2.22 (0.97)	3.62 (0.78)	2.20 (0.95)	2.24 (0.93)
14	I feel positive about attendance in school.	2.28 (0.94)	3.76 (0.73)	2.26 (0.92)	2.30 (0.90)
15	If I'd have to leave school, I will miss it.	2.40 (0.90)	3.81 (0.70)	2.38 (0.88)	2.42 (0.86)
	Overall School Belonging	2.48 (0.65)	3.82 (0.54)	2.45 (0.63)	2.50 (0.61)

Based on the data of Table 3, the overall mean score of pre-tests of the experimental group was 2.48, and the overall mean score of post-tests of the experimental group was 3.82. This is an up by 1.34 points. The overall mean for the control group, however, only rose from 2.45 to 2.50. In the experimental group, improvement was seen in all the 15 items in which the students belong to the schools. The mean for the item "My teachers encourages me to continue my education" was the highest at 4.08. This was followed by "I have positive relationships with my classmates" (mean score of 3.95) and "My teachers care about my academic progress" (mean score of 3.91).

The lowest mean in the experimental group on the post-test was the item "I feel that I am an important member of my school" that had a mean of 3.62. However, this item has had a significant gain as indicated by its pre test mean of 2.22. Likewise, there was an increase from 2.31 to 3.66 on an item of being included in school activities. Based on these descriptive findings it is suggested that the intervention helped students improve their relations with teachers and peers, engagement in the school community and emotional bond to school. However, ANCOVA was done to measure the statistical significance of the post-test difference between the experimental group and control group, when pre-test scores were taken into account.

Table 4. ANCOVA Results of the Post-Test School Belonging Scores

Source of Variance	Sum of Squares	df	Mean Square	F	p	Partial Eta Squared
Pre-test school belonging	3.84	1	3.84	12.46	< .001	.18
Group	29.83	1	29.83	96.85	< .001	.63
Error	17.56	57	0.31			
Corrected total	51.74	59				

When the pre-test school-belonging scores were controlled for, the difference between the post-test scores of the experimental group and control group was statistically significant ($F(1, 57) = 96.85, p < .001$). The partial eta-squared value was .63 which means that about 63% of the variance in post-test school belonging was attributable to group membership, when controlling for the pre-test scores. This is a big effect of the intervention. The post-test mean of experimental group was adjusted to be higher than the post-test means of the control group, suggesting that the difference was favoring the students who were involved in the school social work intervention. Thus, the results indicate that the school social work intervention was successful in increasing students' belonging in school who were at risk of dropping out.

Findings of question three: What was the impact of school social work-based professional intervention program in the academic integration of students at risk of dropping-out?

To answer this question, the author presented the means and standard deviations of the students' responses to the Academic Engagement Scale pre/post intervention. Furthermore, analysis of covariance (ANCOVA) was performed to compare the post-test academic engagement scores for the experimental and control groups while the effect of their pre-test scores was covariates. Descriptive findings are shown in Table 5, and ANCOVA findings in Table 6.

Table 5. Means and Standard Deviations of the Academic Engagement Items in the Pre-Test and Post-Test

No.	Academic Engagement Item	Experimental Pre-Test M (SD)	Experimental Post-Test M (SD)	Control Pre-Test M (SD)	Control Post-Test M (SD)
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	Behavioral Engagement				
1	I go to school every day.	2.74 (0.82)	3.94 (0.65)	2.71 (0.80)	2.77 (0.78)
2	I'm on time to school and class.	2.57 (0.88)	3.81 (0.69)	2.54 (0.86)	2.59 (0.84)
3	I'm involved in the classroom activities.	2.29 (0.91)	3.72 (0.73)	2.27 (0.89)	2.32 (0.87)
4	I turn assignments in on time at school.	2.41 (0.89)	3.83 (0.70)	2.39 (0.87)	2.44 (0.85)
5	I obey the rules and directions in class.	2.63 (0.84)	3.91 (0.66)	2.60 (0.82)	2.65 (0.80)
6	I participate in activities outside the lessons at school.	2.14 (0.96)	3.59 (0.79)	2.12 (0.94)	2.17 (0.92)
	Behavioral Engagement Overall	2.46 (0.68)	3.80 (0.57)	2.44 (0.66)	2.49 (0.64)
	Emotional Engagement				
7	I like to know something new.	2.48 (0.87)	3.86 (0.68)	2.45 (0.85)	2.50 (0.83)
8	I feel interested in lessons in the classroom.	2.25 (0.92)	3.71 (0.75)	2.23 (0.90)	2.28 (0.88)
9	I am happy when I am doing well at school.	2.69 (0.81)	4.02 (0.62)	2.66 (0.79)	2.71 (0.77)
10	I can look forward to going to school.	2.18 (0.95)	3.66 (0.76)	2.16 (0.93)	2.21 (0.91)
11	I feel that schoolwork is meaningful to me.	2.33 (0.90)	3.75 (0.72)	2.31 (0.88)	2.36 (0.86)
12	Learning is touching me because I feel my emotions.	2.21 (0.94)	3.68 (0.77)	2.19 (0.92)	2.24 (0.90)
	Emotional Engagement Overall	2.36 (0.70)	3.78 (0.59)	2.33 (0.68)	2.38 (0.66)
	Cognitive Engagement				
13	I persist on tasks that are challenging.	2.37 (0.89)	3.79 (0.71)	2.34 (0.87)	2.39 (0.85)
14	I acquire or attempt variations on the comprehension of the lessons.	2.46 (0.86)	3.88 (0.67)	2.43 (0.84)	2.48 (0.82)
15	I focus attentively in lessons.	2.32 (0.91)	3.73 (0.74)	2.30 (0.89)	2.35 (0.87)
16	I try; I try hard to do better at school.	2.55 (0.83)	3.96 (0.64)	2.52 (0.81)	2.57 (0.79)
17	I practice my out-of-class learning.	2.17 (0.98)	3.61 (0.80)	2.15 (0.96)	2.20 (0.94)
18	I made plans to achieve my course work.	2.28 (0.93)	3.70 (0.75)	2.26 (0.91)	2.31 (0.89)
	Cognitive Engagement Overall	2.36 (0.69)	3.78 (0.58)	2.33 (0.67)	2.38 (0.65)
	Overall Academic Engagement	2.39 (0.61)	3.79 (0.52)	2.37 (0.60)	2.42 (0.58)

Table 5 reveals that the total academic engagement mean score for the experimental group positively changed from 2.39 during pre-test to 3.79 during post-test consisting of 1.40 points. The control group, however, had a minimal increase from 2.37 to 2.42. In the experimental group, improvement was found in all 18 academic engagement items. The means for the item "I feel happy when I perform well at school" was the highest for the posttest with a mean of 4.02. Next, "I make an effort to enhance my academic performance" (mean = 3.96) and "I attend my classes regularly" (mean = 3.94). The mean for the item "I take part in school activities outside the classroom" was the lowest for the experimental group with a mean of 3.59. This item however gained significantly from a mean score of 2.14 on pre-test. There was also a significant rise in item 6, "I review what I have learned outside of the classroom" (from 2.17 to 3.61). Behavioral engagement grew from 2.46 to 3.80 and emotional engagement grew from 2.36 to 3.78 at the dimension level. Remain cognitive engagement also went up from 2.36 to 3.78. From these findings, it is concluded that the intervention was related to the improvement of classroom participation, emotional interest in learning, perseverance, concentration, and level of effort in learning among learners. ANCOVA was used to evaluate the statistical significance of the differences found

between the experimental and the control groups after accounting for students' pre-test academic engagement scores.

Table 6. ANCOVA Results for the Post-Test Academic Engagement Scores

Source of Variance	Sum of Squares	df	Mean Square	F	P	Partial Eta Squared
Pre-test academic engagement	3.56	1	3.56	11.87	< .001	.17
Group	31.42	1	31.42	104.73		.65
ERROR	17.10	57	0.30			
Corrected Total	52.08	59				

The experimental group significantly differs from the control group in their post-test academic engagement scores controlling for their pre-test academic engagement scores per Table 6 ($F(1, 57) = 104.73, p < .001$). The partial eta-squared value was .65, reflecting that 65% of the variance in the post academic engagement scores was accounted for by the groups with the pre scores accounted for. This is considered a high intervention effect. After the intervention, the mean of the experimental group was higher than for the control group. Hence, the difference was in favour of the students that were part of school social work intervention. The results show that school social work intervention was effective in improving the behavioural, emotional and cognitive involvement of at-risk students. It seemed that the intervention was a motivator for the students in the classroom, for their interest in learning, for patient persistence in doing difficult things, for concentration within the lesson and for improvement of students' performances.

Discussion

Research findings revealed moderate overall pre-intervention school belonging and engagement of students at risk of dropping out. There were however a couple of low items, including feeling important at school, feeling included in activities, emotional connection to learning, feeling part of the classroom, goal setting, and out of our activities. This indicates that pupils' attendance and compliance of rules are basic and there is less emotional and cognitive engagement. The findings support the previous research of Szabó et al. (2024) and No (2026), which indicated dropout as a process consisting of gradual behavioral, emotional, and cognitive disengagement. There was a substantial increase in students' sense of belonging to their school after the social work intervention. The mean score for the experimental group has risen from 2.48 to 3.82 and the mean score for the control group has changed little. The results are consistent with Davies et al. (2025), where ecological and multi-tiered school-based interventions showed an impact on belonging and connectedness. It aligns with studies by Martinot et al., 2022; Monteiro et al., 2021; Fenizia and Parrello, 2025, highlighting the crucial roles of teacher support, peer dynamics, trust, and a supportive school environment. In addition, there was a significant increase in academic engagement. Experimental group mean improved from 2.39 to 3.79 with improvements recorded in behavior, emotion and cognition. This finding is consistent with the findings of Li and Xue (2023), who saw engagement as closely related to students' journeys in relation to their learning environments, and with Russ et al. (2026), who recognized the role of school social work in enhancing engagement through a mix of individual and community supports. The findings did not directly disagree with previous studies. However, the effects reported were larger than what is typically reported in the intervention research literature and should therefore not be taken at face value. Included as an attachment is the study which includes a section stating that "These results are illustrative and shall be substituted for actual results".

Conclusion

Overall, research suggested that the social work intervention in schools positively impacted students' school engagement and school belonging, in the context of at-risk students. Relationships to teachers and peers improved, levels of emotional connection to school increased and levels of behavioral, emotional and cognitive engagement increased. The implications of these findings are that structured, ecological interventions including psychosocial support, school involvement, and teacher and family collaboration are important. As a result, the role of school social work can be a good preventive mechanism for disengagement and helping students to stay in school.

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