Jeha *et al. BMC Nutrition* (2026) 12:150
https://doi.org/10.1186/s40795-026-01374-5

BMC Nutrition

RESEARCH Open Access

Changes in food literacy following a one-week experiential culinary education intervention in school-age children

Karissa Jeha[1*], Coralie Vincent[2,3] and Isabelle Giroux[1,3*]

Abstract

Background Food literacy is a multidimensional construct encompassing the knowledge, skills, and attitudes needed to make informed food choices and support healthy eating. Food literacy education is important for fostering lifelong positive eating behaviours. However, evidence on intensive experiential, culinary education interventions for school-aged children remains limited. The objective of this study was to assess changes in food literacy skills following a one-week experiential culinary education intervention among school-aged children attending a university-based culinary summer camp.

Methods A theory-informed, child-centered culinary intervention was developed using a competency-based framework to support structured skill development. A single-arm, baseline-to-endpoint study design was used to evaluate change in food literacy skills among children aged 8–12 attending a one-week culinary summer camp. Food literacy skills were assessed using an observational scoring rubric informed by a competency framework and the Experiential Learning Theory, measuring six domains: autonomy, ease and safety, measuring, hygiene, working with others, and confidence. Each domain was scored on a 12-point scale, with higher scores indicating greater skill proficiency. Paired-samples t-tests were conducted to evaluate changes. Effect sizes (Cohen's dz) and 95% confidence intervals were calculated.

Results Eighty-eight children participated in the culinary intervention. Significant improvements were observed across all six food literacy domains following the intervention ($p < .001$). Mean score increases ranged from 1.46 to 2.47 points, with effect sizes ranging from moderate to large (dz = 0.62–1.36), indicating meaningful improvements in observed food literacy skills over the one-week period. Improvements were particularly notable for the ease and safety, measuring, and confidence domains.

Conclusions This intensive experiential culinary education intervention was associated with significant improvements in food literacy skills among school-aged children. These findings support the potential of immersive, skills-based food literacy programs and highlight the value of experiential learning approaches for supporting children's food literacy development.

*Correspondence:
Karissa Jeha
kjeha005@uottawa.ca
Isabelle Giroux
igiroux@uottawa.ca

Full list of author information is available at the end of the article

Keywords Food skills, Summer camps, Community-based programs, Child nutrition, Experiential learning, Nutrition education

Background

Food literacy can be broadly defined as the knowledge, skills, and attitudes individuals possess regarding food and nutrition, enabling them to make informed food choices and understand its impact on their health [1, 2]. Educating school-age children in food literacy helps develop fundamental knowledge, skills, and attitudes, including understanding food groups, preparing meals, and fostering a positive relationship with food. These competencies are associated with healthier dietary behaviours, which may reduce cumulative exposure to recognized modifiable dietary risk factors for non-communicable diseases [3–6]. However, opportunities for children to develop practical food-related skills may vary across home and school environments [7–9]. Potential barriers to food literacy development include limited access to structured, hands-on, food preparation experiences, including reduced availability of home economics and food skills courses in school settings, as well as variability in home-based food-related education [7, 8, 10]. Given the importance of the development of eating behaviours during childhood [11, 12], there is a need for effective food literacy education to support the development of healthy food habits from an early age.

Experiential learning approaches are particularly appropriate for children, as hands-on, activity-based programs support skill development, engagement, and critical thinking during this developmental stage [13–16]. Emerging evidence suggests that short, structured interventions may be appropriate and beneficial for school-aged children, with some studies demonstrating improvements in skill acquisition, behaviours, and learning outcomes [13, 14]. Furthermore, community-based nutrition programs may provide opportunities for complementary and engaging skill development beyond the traditional classroom or home-based environments [13, 17]. For example, a Quebec-based study involving children aged 8 to 12 years old, evaluated the influence of a short-term community-based nutrition education intervention on certain components of food literacy. They observed improvements in specific abilities using an observational rubric; however, the authors noted important limitations, including the absence of a kitchen, the small number of recipes (three recipes over three weeks), and the lack of actual cooking, as the recipes were simple assembly-style, which limited the depth of experiential skill development [13].

Joyce Slater's framework on food literacy emphasizes a holistic approach that identifies a comprehensive set of competencies required by youths for the development of a healthy relationship with food across the life course [5]. Utilizing this framework alongside the Experiential Learning Theory developed by David Kolb [18], supports an integrative approach to designing, implementing and evaluating children's food literacy. In this way, Slater's framework informs the targeted competencies while Kolb's theory guides the experiential learning approach.

Middle childhood (approximately ages 8–12 years) represents an important developmental period for the acquisition of practical food-related skills. This developmental stage aligns with the concrete operational stage of Piaget's theory of cognitive development, during which children begin to apply logical reasoning, adopt less egocentric perspectives, and engage more actively with their environment [19, 20]. According to Gesell [21], children around age eight begin to exhibit increased curiosity and active engagement with their environment, characteristics that may support participation in hands-on learning activities. Therefore, from the perspective of the Experiential Learning Theory and the aforementioned food literacy competency framework, middle childhood represents a particularly appropriate period for experiential culinary education.

Despite these advances, important gaps remain in the literature on community-based, theory-informed nutrition education interventions that emphasize skill development and are developmentally tailored to school-aged children [13, 15, 22, 23]. This study sought to address this gap by evaluating a theory-informed, intensive experiential culinary intervention designed to support children's food literacy skills development.

Accordingly, the objective of this study was to evaluate changes in food literacy skills following participation in a one-week, experiential, culinary education intervention among school-aged children attending a university-based culinary summer camp.

Methods

Study design and setting

This study adopted a single-arm pre–post (baseline-to-endpoint) exploratory design (see Fig. 1) to evaluate changes in food literacy skills among children participating in a one-week culinary education intervention. Data were collected at the start (Monday) and end (Friday) through structured observations of food literacy skills, allowing for the assessment of change from baseline to endpoint.

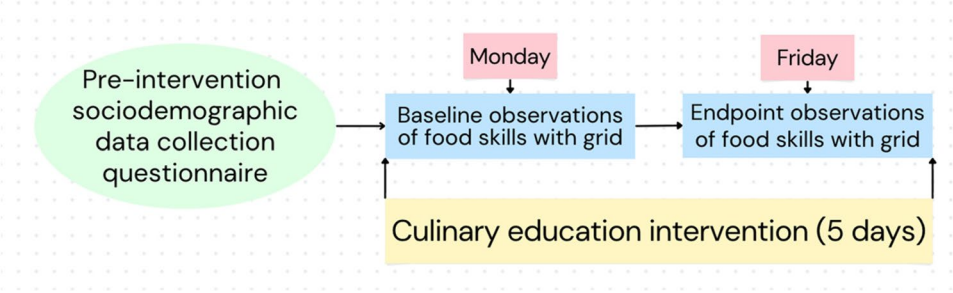

Fig. 1 Methodology of the project

Participants, recruitment and ethics

The target population consisted of child–parent (or guardian) dyads with children aged 8–12 years enrolled in the University of Ottawa Gee-Gee's Culinary Summer Camp between June 23 and August 15, 2025. Eligibility criteria included enrolment in the camp and being aged 8–12 years. Parents were contacted via the camp's registration database at least one week before the start of camp. The initial email provided comprehensive study information, including the researchers' introduction, study purpose, participation requirements (including a pre-intervention online sociodemographic questionnaire and observation of the children's cooking skills), benefits of participation, confidentiality assurances, and the voluntary nature of involvement. Both parental consent and child assent were obtained, with all data anonymized and securely stored. Written informed consent was obtained from parents or legal guardians of all participants under the age of 16, and assent was obtained from the children prior to participation. Participation did not affect the children's camp experience, as all activities remained identical for study participants and non-participants.

On the first morning of the intervention, the primary investigator (K.J.), a Registered Dietitian, also invited children and their parents to participate, in person, as an alternative to online enrollment, providing information consistent with the email. Written informed consent was obtained from parents or legal guardians of all participants under 16 years of age, and assent was obtained from the children before any data collection. In total, 88 child–parent dyads were enrolled in this study.

The study protocol was approved by the Office of Research Ethics and Integrity of the University of Ottawa.

Intervention

The culinary education intervention was delivered within the Gee-Gee's Culinary Summer Camp at the University of Ottawa. The intervention consisted of one-week workshops, delivered from Monday to Friday, with hands-on cooking sessions designed to progressively develop food literacy skills. Cooking sessions were complemented by structured, interactive nutrition activities focused on food literacy, including handwashing and food safety education, basic nutrition education using the Canadian Food Guide, farm-to-table education through an off-site outing, cultural food exploration, discussions of food origins, food waste education, and food myth versus reality activities.

The intervention was informed by the Experiential Learning Theory [18], which emphasizes learning through active participation and reflection on experience. Hands-on cooking sessions provided opportunities for school-aged participants to engage in concrete experiences and active experimentation as they practiced and refined culinary skills.

The intervention was also guided by Slater's food literacy framework [5], which identifies observable and practical competencies supporting food literacy development. Although originally developed for young adults, the competencies were adapted to support developmentally appropriate skill acquisition among school-aged children. Competencies are categorized into three domains within the framework: 1) Functional Competencies, which include confidence and empowerment with food; 2) Relational Competencies, emphasizing joy and meaning through food; and 3) Systems Competencies, focusing on equity and sustainability within food systems.

To support progressive skill development, participants completed 12 recipes over the course of the week, with increasing complexity and repeated exposure to key skills. Recipes had specific learning objectives and targeted skills that corresponded to the various food literacy rubric domains, allowing participants to practice and reinforce previously learned skills. Recipes were reviewed by dietitians to ensure alignment within the group's developmental stage, to facilitate progressive learning and ensure appropriate difficulty level. Examples of recipes and the scaffolded progression of learning objectives across the intervention are presented in Table 1.

The intervention was delivered between June 23 and August 15, 2025, and consisted of eight one-week workshops. Each workshop ran Monday to Friday from 9:00 a.m. to 4:00 p.m. Daily preparation of morning and afternoon snacks combined took approximately 1.5 h, while

Table 1 Full list of recipes, learning objectives, and targeted skills for days 1 and 5

	Example of recipe	Targeted skills	Learning objectives
Monday (day 1)	Fruit skewers with cream cheese dip;Ham (or chickpea) and corn pasta salad;Chocoyo (chocolate yogurt with fruit)	- Measuring (dry measuring cups and spoons) - Basic mixing and stirring techniques - Single-step and short multi-step ingredient assembly - Stove-top safety awareness (boiling water with supervision) - Understanding basic kitchen processes (boiling, draining, rinsing, mixing) - Using basic kitchen equipment (mixing bowls, whisk, pot, colander, spoon) - Practicing kitchen hygiene (hand washing, rinsing canned foods, clean-as-you-go habits) - Building comfort and confidence in the kitchen	Introduce basic food preparation and kitchen safety; build confidence following simple, low-risk recipes while becoming familiar with common ingredients, tools, and kitchen routines
Friday (day 5)	Do it yourself (DIY) smoothie; Breakfast for lunch (pancakes or waffles, eggs, lemonade); Black bean brownies	- Measuring (dry and wet ingredients using multiple techniques) - Recipe choice and customization (smoothie ingredients, egg preparation style) - Advanced multi-step food preparation - Coordinating several recipes simultaneously - Stove-top cooking with independence (pancakes, eggs, syrup base) - Oven baking and doneness awareness - Blending and food processing techniques - Understanding ingredient functions (leavening, binding, moisture) - Time management and workflow planning - Safe handling of raw ingredients (eggs) - Use of advanced kitchen equipment (blender, food processor, oven, stove top, griddle) - Creativity, autonomy, and confidence in meal preparation	Apply cumulative food preparation and cooking skills to independently plan and prepare a complete, multi-component meal; strengthen autonomy, confidence, creativity, and decision-making while managing timing, tools, and techniques across several recipes

lunch preparation took approximately 1 to 1.5 h. Additional nutrition-related education activities averaged approximately 3 h per day. In total, participants received approximately 6 h of intervention programming per day, as well as 1 h allocated for lunch. All cooking sessions and nutrition activities were included as part of the intervention.

Cooking sessions were mostly conducted in small groups (typically 2–4 children) to encourage collaboration and engagement. Sessions were facilitated by a multidisciplinary team, including the principal investigator, two trained research assistants, a nutrition student and a Registered Dietitian, and two dietetic interns, while camp counsellors supported child safety and organization. All members interacted with participants as part of the regular camp team to support a naturalistic camp environment and minimize potential reactivity to observation.

The intervention was conducted in a fully equipped teaching kitchen at the University of Ottawa, School of Nutrition Sciences, within the Faculty of Health Sciences. Participants had access to standard kitchen equipment and received printed educational materials in the form of a learning booklet. The intervention was delivered bilingually, with recipes displayed on screens in both French and English to enhance instruction and engagement; additional support was provided as needed for participants whose primary language was neither English nor French.

Measures

The primary outcome was change in observed food literacy skills from baseline to endpoint, assessed using a structured observational scoring rubric completed by three trained members of the research team (the Primary Investigator and the two research assistants) during cooking workshops. These three observers completed training prior to data collection using a rubric guide, and initial scoring was followed by discussions to standardize interpretation of scoring criteria. After each cooking session, observers recorded ratings independently for their assigned participants and then met as a team to review and discuss scoring decisions and promote consistency across raters. The observers assessed the same participants at both baseline and endpoint to further promote scoring consistency. Using this process allowed the observers to reach an agreement on all scores. Inter-rater reliability was not formally quantified.

The observational scoring rubric incorporated elements of analytic and developmental rubrics and measured six food literacy skills domains: autonomy (e.g., ability to follow a recipe), ease and safety (e.g., in using basic kitchen equipment and tools), measuring (e.g., ease in measuring solid and liquid ingredients), hygiene (e.g., handwashing before and after food preparation), working with others (e.g., ability to prepare a meal as a group), and confidence (with cooking) [24, 25]. Domains and scoring criteria were adapted from a Quebec-based observational rubric used in a similar context and tailored to the study setting, available resources, and age-appropriate competencies aligned with Slater's framework [5, 13]. The rubric included: 1) skill domains, 2) a rating scale to quantify the level of proficiency for each domain, and 3) space for observer notes. Each domain was anchored on a four-point scale, with higher scores indicating greater competence. To capture smaller changes in skill development within each level, this study recorded scores using

an internal subscale from 1 to 12 aligned with the 4-point anchors (1–3, 4–6, 7–9, 10–12). An additional file shows the full rubric in more detail [see Supplementary Material 1].

Data collection procedures

Data were collected by the three observers. Each observer was assigned a subset of participants, and observations occurred in the teaching kitchen during and following cooking sessions. Baseline (Monday) and endpoint (Friday) scores were derived from observations conducted across the three cooking sessions on each respective day, providing participants with multiple opportunities to demonstrate food literacy skills. Observers monitored participants' food literacy skills as outlined in the observational scoring rubric. To minimize reactivity, no overt note-taking occurred during sessions. Immediately after each session, observers completed rubric ratings for their assigned participants and recorded brief notes as needed. Observers then met to review and discuss ratings and clarify scoring decisions using the rubric guide to support consistency across observers until consensus was reached. Although rubric ratings were completed continuously over the week-long workshop to support ongoing monitoring, only baseline and endpoint ratings were used in analyses to assess the presence of change.

Table 2 Descriptive data of participants at baseline ($n = 60$)

Variable	Descriptive Statistics
Age ($n = 60$)	
Mean (SD)	9.8 (1.0)
Median	10
Sex ($n = 60$)	*n* (%)
Female	44 (73.3)
Male	16 (26.7)
Cooking frequency ($n = 56$)	*n* (%)
Weekly	28 (50.0)
Monthly	15 (26.8)
Few times a year	8 (14.3)
Never	5 (8.9)
Racial identity ($n = 59$)	*n* (%)
White/Caucasian	45 (76.3)
Asian	4 (6.8)
Mixed	10 (16.9)
Parental education level ($n = 60$)	*n* (%)
High School or less	3 (5.0)
College/*Cégep*	3 (5.0)
University (undergraduate)	18 (30.0)
University (graduate)	36 (60.0)

Data is presented as *n* (%) unless otherwise specified. *SD* Standard Deviation, *n* number, *CégepCollège d'enseignement général et professionnel*. Sample size varied due to missing data (*n* range: 56–60). Descriptive statistics were only available for participating children whose parent (or guardian) filled the full pre-intervention sociodemographic questionnaire; education data are representative only of the responding parent

Statistical analysis

Descriptive statistics were used to summarize participating child and parent sociodemographic characteristics at baseline. Continuous variables are presented as means and standard deviations (SD) or medians, as appropriate, while categorical variables are presented as frequencies and percentages. Statistical analysis was conducted using SPSS software (version 30). Due to incomplete parent pre-intervention sociodemographic questionnaire data, descriptive characteristics are reported for participants with available data only.

Changes in food literacy skills from baseline to endpoint were assessed using paired-samples t-tests. Children with more than 75% missing outcome data (≥ 5 missing food literacy skills domains) at either baseline or endpoint were excluded. Analysis was conducted using all participants with complete paired observations for each outcome. Mean changes are reported with corresponding 95% confidence intervals (CI). Effect sizes were calculated as Cohen's dz, using the standard deviation of the paired differences. All tests were two-tailed, and statistical significance was set at $p < .05$. No adjustments for multiple comparisons were applied due to the exploratory nature of the study and the conceptual relatedness of the food literacy skills domains.

Results

Participant characteristics

A total of 88 parent-child dyads provided consent to participate in this research study. The final analytical sample for paired-data analysis included 85 children, as three children were absent on Friday and consequently had > 75% missing endpoint data. Descriptive characteristics are presented in Table 2 and reflect participants whose parents completed the pre-intervention sociodemographic questionnaire ($n = 60$). The mean age was 9.8 years (SD = 1.0; median = 10). The sample was composed of 73.3% girls and 26.7% boys. Based on parental reports, half of the children cooked at home at least weekly (50.0%), and most identified as White/Caucasian (76.3%). Most parents reported a university-level education (90.0%), including 60.0% with graduate-level education.

Change in observed food literacy skills

Participants demonstrated significant improvements across all six food literacy domains following the one-week culinary education intervention (Table 3). Mean autonomy scores increased from baseline (7.37 ± 1.90) to endpoint (9.35 ± 1.91), corresponding to a mean change of 1.97 points (95% CI: 1.49–2.46; t(77) = 8.04, $p < .001$) and a large effect size (Cohen's dz = 0.91). Significant improvements were also observed for ease and safety, measuring, hygiene, working with others, and confidence, with mean changes ranging from 1.46 to 2.47 points (all

Table 3 Changes in food literacy skills from baseline to endpoint ($n = 85$)

Skill Domains	Baseline food literacy skills score, mean ± SD	End of intervention food literacy skills score, mean ± SD	Mean score change, mean ± SD (95% CI)	t(df)	*p*	Cohen's dz (95% CI)
Autonomy ($n = 78$)	7.37 ± 1.90	9.35 ± 1.91	1.97 ± 2.17 (1.49–2.46)	8.0 (77)	< 0.001	0.91 (0.64–1.17)
Ease and safety ($n = 72$)	7.54 ± 1.77	10.01 ± 1.46	2.47 ± 1.92 (2.02–2.92)	10.9 (71)	< 0.001	1.28 (0.97–1.60)
Measuring ($n = 75$)	7.71 ± 1.94	10.09 ± 1.77	2.39 ± 1.98 (1.93–2.84)	10.4 (74)	< 0.001	1.21 (0.91–1.50)
Hygiene ($n = 80$)	8.21 ± 1.83	9.68 ± 2.17	1.46 ± 2.33 (0.95–1.98)	5.6 (79)	< 0.001	0.62 (0.39–0.87)
Working with others ($n = 81$)	8.25 ± 1.94	10.09 ± 1.37	1.84 ± 2.08 (1.38–2.30)	8.0 (80)	< 0.001	0.88 (0.62–1.14)
Confidence ($n = 82$)	7.41 ± 2.05	9.83 ± 1.67	2.42 ± 1.77 (2.02–2.81)	12.3 (81)	< 0.001	1.36 (1.06–1.66)

Paired-samples t-tests were used to compare baseline and endpoint scores. Scores were rated from 1 to 12, with 1 representing the lowest score and 12 representing the highest score. Effect sizes are reported as Cohen's dz. All 85 participating children had baseline and endpoint data and met the ≥ 75% skill observation threshold; however, due to some missing data within specific domains, the sample size varied by domain ($n = 72–82$)

$p < .001$). Effect sizes across domains were moderate to large (Cohen's dz range: 0.62–1.36), indicating meaningful improvements in observed food literacy skills over the course of the education intervention.

Discussion

This study evaluated changes in food literacy skills among school-age children aged 8–12 years over the course of a one-week culinary education intervention. Overall, the findings demonstrated multidimensional improvements in food literacy skills, with significant gains observed across all six evaluated domains. These findings are consistent with prior research that suggests that hands-on culinary interventions can improve food literacy and cooking-related skills in school-aged children [13, 14, 22, 23]. This study extended upon previous similar interventions by designing intensive, full-time interventions spanning five consecutive days, including the preparation of over 12 different recipes in a fully equipped teaching kitchen, and intentionally structuring sessions to support progressive skill development aligned with defined food literacy domains. However, given the single-group design, findings are associative rather than causal.

The sample comprised a higher proportion of female than male participants, a common pattern in food-literacy research, which may reflect sociocultural norms and traditional gendered expectations related to cooking [26, 27]. Moreover, half of the participants reported cooking weekly at home, and the majority of parents had a university-level education. These characteristics suggest a relatively advantaged socioeconomic background and a potentially higher baseline exposure to food-related opportunities, which is relevant when interpreting the magnitude of change. Parental education and income may influence existing skill levels and adherence to dietary recommendations through resource access and food environments [28–30]. Although participants demonstrated relatively strong baseline food literacy skills, which may attenuate change due to restricted variance or potential ceiling effect [31], moderate to large effect sizes were observed across outcomes. These findings suggest that food literacy interventions can produce measurable improvements even among children with relatively strong initial skill levels.

Improvements were particularly evident in functional competencies, including measuring, ease and safety with kitchen equipment, and hygiene practices. These domains involve hands-on task execution, suggesting that the intervention supported the development of practical cooking skills through repeated, structured practice and guided feedback during cooking sessions. This pattern is consistent with experiential learning approaches, particularly the Experiential Learning Theory [18], which posits that learning is optimized through experience, reflection, conceptualization, and experimentation. In this context, participants were able to engage directly in food preparation tasks, reflect on culinary team members' feedback, and refine their skills through repeated practice across sessions [18].

Participants also demonstrated improvements in intrapersonal competencies, including autonomy and confidence, both of which showed large effect sizes (dz = 0.91 and dz = 1.36, respectively), with confidence showing the largest improvements overall. At the start of the intervention, trained team members introduced new skills, after which children practiced these tasks independently under supervision, fostering confidence through gradual autonomy. Repeated opportunities for successful task completion, combined with positive feedback, likely contributed to improvements in autonomy and confidence. This interpretation is consistent with Bandura's self-efficacy framework, which emphasizes that mastery

experiences and modelling are key drivers of confidence development [32].

Improvements were also observed in participants' ability to work with others in the kitchen (dz = 0.88). The intervention structure emphasized collaborative cooking sessions that required participants to share responsibility and solve problems together. Many recipes were completed in small groups without pre-assigned roles, requiring participants to negotiate tasks and coordinate their efforts. The observed improvement in collaborative skills suggests that the group structure of the intervention facilitated the development of interpersonal food literacy skills.

Collectively, the findings demonstrate measurable improvements across functional, intrapersonal, and interpersonal competencies, suggesting that the intervention supported multidimensional food literacy development. Practical skills such as measuring, equipment handling, and hygiene provided the foundation for successful task execution, while increases in autonomy and confidence strengthened participants' capacity to manage tasks independently. Simultaneously, improvements in collaboration further supported shared food preparation skills. Although categorized for analytical purposes, these domains are interdependent and mutually reinforcing, with development in one domain supporting growth in others. The magnitude of change observed over a one-week culinary intervention suggests that a short-term, intensive culinary interventions may support rapid food literacy skill development in this age group. The structured, framework-oriented, child-centered approach, including scaffolded skill progression, repeated practice and guided feedback, likely contributed to these improvements.

Contributions and strengths

This study adds to the limited literature on community-based nutrition interventions for school-aged children, particularly those that emphasize developmentally appropriate, skill-based and experiential approaches. While prior research has examined nutrition education interventions, fewer studies have evaluated intensive hands-on culinary programs grounded in theoretical frameworks and assessed using structured observational measures [14, 16, 22].

By integrating Experiential Learning Theory and the Slater's food literacy framework [5, 18], this study provides a theoretically informed example of a community-based culinary intervention designed to support multidimensional food literacy skills development.

Several methodological features strengthen the study. The intervention was delivered in a fully equipped teaching kitchen, allowing school-aged participants to engage in realistic hands-on food preparation. The structured progression of recipes and repeated skill exposure supported incremental learning over the course of the intervention. Data collection was designed by dietitians and conducted by trained observers using a standardized rubric and supported by team discussions to enhance scoring consistency.

Together, these strengths support the feasibility of intensive, experiential culinary education programs and provide evidence that short-term interventions could produce measurable improvements in children's food literacy skills.

Limitations

Several limitations should be considered when interpreting these findings. First, the single-group pre–post design limits causal inference due to the absence of a control group. Observed improvements may therefore reflect factors beyond the intervention itself. Second, despite repeated reminders from the research team and the sociodemographic questionnaire being made available both in person and electronically, a substantial proportion of parents did not complete the questionnaire. This limited our ability to comprehensively characterize the study sample. For dyads with available data, the majority of participants had parents with university-level education, and camp registration fees may have limited participation to children from families with greater financial resources. Participants may therefore have had higher baseline food literacy skills than the general population, limiting generalizability to more socioeconomically diverse groups. Third, the short duration of the study limits conclusions regarding long-term retention and sustainability of food literacy skills. Finally, the observational rubric used in this study has not been formally validated. Although the rubric was informed by previously published work and adapted to the study context, the lack of validated observational tools for food literacy assessment in children remains an important limitation.

Implications for future research and practice

Future research should evaluate longer-term impact of experiential culinary education interventions, including the sustainability of food literacy skills beyond the intervention period. Studies incorporating longer follow-up periods would help clarify whether the short-term skill gains translate into lasting behavioural changes. Future interventions should also explore strategies to improve accessibility and participation among families from diverse socio-economic backgrounds, including partnerships with schools or community interventions [30]. Interventions that include child–parent dyads may further support the transfer and maintenance of food literacy skills within the home environment. Expanding implementation to alternative settings such as schools,

after-school programs, weekend programs, and community centres may further support the integration of food literacy education into children's everyday environments.

Finally, incorporating comparison groups or randomized designs would strengthen causal inference and improve understanding of intervention effectiveness. In addition, qualitative approaches may provide valuable insight into participants' experiences and perceived impacts, supporting refinement of future education programming.

Conclusion

This study found that participation in a one-week experiential culinary education intervention was associated with measurable improvements in multiple domains of food literacy skills among children aged 8–12 years. Observed gains were evident across functional skills (e.g., measuring, equipment use, and hygiene), intrapersonal competencies (autonomy and confidence) and interpersonal skills (working with others), suggesting that short-term intensive learning interventions can support multidimensional food literacy development in school-aged children.

By combining a theory-informed, experiential approach with direct observational assessment of food literacy skills, this study contributes to the limited literature on community-based food literacy interventions designed for children. These findings support the potential value of structured, hands-on culinary education programs as developmentally appropriate strategies to promote practical food-related skills in school-age children over a short period of time.

The results are relevant for dietitians, educators, and program developers seeking to implement accessible and engaging food literacy initiatives in community and school settings. Future research should evaluate the longer-term sustainability of skill gains and explore implementation across more socioeconomically diverse populations.

Overall, this study highlights the potential of structured experiential culinary programs to support the development of practical food literacy skills and foster positive food-related behaviours during middle childhood.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s40795-026-01374-5.

Supplementary Material 1.

Acknowledgements

The authors thank the culinary camp team members for their support with intervention delivery and data collection. The authors also acknowledge the University of Ottawa, Faculty of Health Sciences, for the Food Preparation Laboratory required for this study. The authors thank the participating children and their parents or guardians for their involvement in the intervention.

Use of artificial intelligence

Artificial intelligence tools were used to assist with language refinement and clarity. The authors reviewed and edited all content and take full responsibility for the work.

Authors' contributions

Conceptualization, K.J. and I.G.; Methodology, K.J. and I.G.; Formal analysis, C.V. and K.J.; Investigation, K.J.; Writing—original draft preparation, K.J.; Writing—review and editing, K.J., C.V., and I.G.; Supervision, I.G.; Project administration, K.J. and I.G. All authors have read and approved the final version of the manuscript.

Funding

Food costs for the camp were covered by the camp registration fee. This study was partly supported by a professor research fund.

Data availability

The datasets generated and/or analysed during the current study are not publicly available because participating children (minors) and their parents did not consent to open data sharing.

Declarations

Ethics approval and consent to participate

for this study was obtained from the University of Ottawa Research Ethics Board (Ethics file number: H-05-25-11137). Written informed consent was obtained from parents or legal guardians of all participants under the age of 16, and assent was obtained from the children prior to participation. This study was conducted in accordance with the Canadian Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans [33] and in respect of the Helsinki Declaration of World Medical Association.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

[1]School of Nutrition Sciences, Faculty of Health Sciences, University of Ottawa, 200 Lees Ave (FHS building, office 418L), Ottawa K1S 5S9, ON, Canada
[2]Interdisciplinary School of Health Sciences Faculty of Health Sciences, University of Ottawa, 200 Lees Ave (FHS building, office 418L), Ottawa K1S 5S9, ON, Canada
[3]Institut du Savoir Montfort, Ottawa, ON, Canada

Received: 7 April 2026 / Accepted: 21 May 2026
Published online: 29 May 2026

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