



Institutional Accountability and Outcome Transparency in Publicly Funded Learning Programs

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ABSTRACT

This study investigates how institutional accountability and outcome transparency can be measured in publicly funded learning programs. The study is designed to analyze approximately 80 publicly funded programs across cultural education, community learning, vocational enrichment, and lifelong learning sectors. Data sources include enrollment records, completion data, learner satisfaction surveys, teaching quality evaluations, budget reports, feedback records, and follow-up participation data. The dataset is expected to include around 18,000 learner records, 6,500 satisfaction survey responses, 1,200 teacher evaluation forms, and 80 institutional budget-performance reports. The study constructs an Outcome Transparency Index covering five dimensions: access equity, instructional quality, completion effectiveness, feedback responsiveness, and public value. Quantitative methods include entropy-weighted scoring, principal component analysis, data envelopment analysis, hierarchical regression, and structural equation modeling. The study also compares program performance across funding scale, institution type, learner background, and delivery mode. The innovation of this study lies in building a measurable accountability framework that connects public funding, learning outcomes, learner experience, and institutional reporting quality, rather than relying only on enrollment numbers or completion rates to judge program effectiveness.

1. Introduction

Publicly funded learning programs play an important role in cultural education, community learning, vocational development, adult education, and lifelong learning. Unlike conventional formal education, these programs often serve highly diverse groups of learners whose ages, incomes, educational backgrounds, employment situations, and learning needs differ considerably. Their objectives may also extend beyond academic achievement to cultural participation, employability, social inclusion, personal development, and community engagement. Because such programs are supported wholly or partly by public resources, institutions are expected to demonstrate not only how funds are allocated but also whether these resources generate meaningful educational and social outcomes. International policy research has therefore placed increasing emphasis on the relationship among education expenditure, participation, learning outcomes, and equity (Gui et al., 2025; Syafii et al., 2025). This issue is particularly relevant to public cultural and

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arts education, where instructional organization and resource utilization may directly affect the efficiency of public educational provision. Recent research in public art education, for example, has examined collaborative piano teaching models together with the optimization of teaching-resource efficiency, indicating the importance of considering pedagogical organization and resource use within the same evaluation framework (Lin et al., 2026). Broader international evidence similarly suggests that education systems should move beyond simple participation statistics and examine whether public investment contributes to equitable access, meaningful learning, and sustainable educational benefits (Jangde & Ahmad, 2025).

Despite this growing emphasis on outcomes, the accountability systems used in many publicly funded programs remain strongly dependent on administrative indicators. Enrollment, attendance, completion, and total expenditure are relatively easy to collect and compare, and they therefore continue to occupy a central position in institutional reports. These indicators are useful for describing program scale and operational activity, but they provide limited information about whether disadvantaged learners can participate on equal terms, whether instruction is effective, whether participants consider the learning experience useful, or whether the program produces wider public benefits. Evidence from education finance also shows that higher expenditure does not automatically lead to stronger learning outcomes. The effect of funding depends on how resources are converted into teaching, learner support, instructional materials, staffing, and program delivery (Chen et al., 2025; Xu et al., 2026). Public accountability therefore requires more than a record of how much money has been spent. It also requires evidence showing what educational processes were supported and what results followed from that expenditure. Previous research has found that public institutions frequently state broad social or educational goals while continuing to report primarily on activities, service volumes, and immediate outputs (Moldashev et al., 2026). A gap consequently remains between institutional mission statements and the measures used to demonstrate actual performance. This gap has encouraged growing interest in outcome-oriented evaluation. Existing studies have approached accountability through program evaluation, financial disclosure, stakeholder assessment, governance arrangements, and institutional performance measurement. Program evaluation research has shown that many evaluation systems are better at capturing short-term participation and immediate learning changes than longer-term educational, behavioral, or social outcomes (Du, 2025). Financial transparency represents another important component of accountability. Greater public access to budget and expenditure information may strengthen institutional trust and allow stakeholders to understand how public money is distributed (Jiao et al., 2026). Nevertheless, financial openness alone cannot establish whether teaching is effective or whether learners benefit from a program. An institution can report its expenditure accurately while still providing limited evidence regarding instructional quality, learning gains, participant satisfaction, or social value. For this reason, financial transparency and outcome transparency should be treated as related but distinct dimensions of public accountability. The difficulty is further increased by differences in what stakeholders consider a successful educational program. Learners may attach particular importance to affordability, accessibility, teaching quality, practical usefulness, instructor support, and opportunities for continued development. Government agencies may place greater weight on participation, completion, cost control, employment effects, social inclusion, and measurable public returns. Educational institutions must often balance these expectations while also meeting administrative and reporting requirements. Previous studies have shown that different stakeholder groups may therefore evaluate the same educational program according to substantially different criteria (Panwale & Vijayakumar, 2025). Evaluation choices themselves can also be shaped by policy objectives, funding arrangements, and institutional

priorities (Zhang, 2026), while public perceptions of educational quality may differ from the indicators adopted by governments or providers (Xie et al., 2026). These differences are important because an accountability framework that relies heavily on a single administrative measure may represent institutional performance poorly even when the underlying data are technically accurate.

Governance research provides a related perspective. Publicly funded education generally operates through interactions among government departments, educational institutions, teachers, employers, learners, community organizations, and other local stakeholders (Avelar, 2025; Xiong et al., 2026). Accountability is consequently distributed across several actors rather than concentrated in one institution. Funding agencies may determine eligibility rules and reporting requirements, institutions organize teaching and allocate resources, instructors influence the quality of implementation, and learners provide evidence regarding participation and educational experience. Employers and community organizations may also contribute information about the relevance and wider value of program outcomes. A meaningful accountability system should therefore connect financial inputs with institutional processes and learner-level results while remaining understandable to multiple stakeholder groups. This requirement is particularly important for community, cultural, vocational, and lifelong-learning programs, where outcomes may be broader and less standardized than those used in schools and universities. Quantitative approaches have increasingly been introduced to address this measurement problem. Cost-effectiveness analysis can relate educational gains to the resources required to produce them (Hong et al., 2026), while data envelopment analysis (DEA) has been used to compare the relative efficiency of educational institutions with multiple inputs and outputs (Li et al., 2026; Sharifi et al., 2026). Composite indicators and policy indices provide another way to combine several dimensions of funding or program performance into a single analytical structure (Drago et al., 2025; Zhang & Wang, 2026). These methods have clear advantages because they allow programs with different resource structures and outcome profiles to be compared using a common analytical framework. However, each approach also captures only part of the accountability problem. Efficiency analysis may identify whether an institution converts inputs into measurable outputs effectively, but it does not necessarily capture learner experience, responsiveness to feedback, or the fairness of program access. Policy indices can summarize the design or implementation of funding policies, but favorable policy scores do not automatically demonstrate improvements in learning. Similarly, cost-effectiveness analysis may favor easily quantified outcomes while giving less weight to cultural participation, learner confidence, community engagement, or other forms of public value that are important in non-formal education. A further limitation is that funding, instructional quality, learner experience, efficiency, and public reporting are often examined in separate research streams. Studies of education finance generally emphasize expenditure and resource allocation, whereas studies of teaching quality focus more closely on instructional processes and learner outcomes. Research on satisfaction and learner experience frequently relies on survey evidence without linking these responses to institutional expenditure, and governance studies often concentrate on policies and reporting procedures rather than learner-level results. As a consequence, the literature provides relatively few frameworks in which financial input, educational process, learner outcome, and reporting quality can be examined simultaneously. Some program-evaluation studies have combined learning outcomes, participant feedback, and implementation evidence (Huang, 2026), but such integrated approaches remain less common in the evaluation of publicly funded education. The available evidence is also concentrated heavily in universities, schools, and large national education systems. Community education, publicly supported cultural programs, adult-learning initiatives, and other forms of lifelong learning have received comparatively limited quantitative

attention. These programs present additional measurement difficulties because they vary greatly in duration, curriculum, learner characteristics, delivery mode, institutional scale, and intended outcomes. A short community arts program, for example, cannot reasonably be evaluated using exactly the same output structure as a multi-month vocational qualification. Differences in age, previous educational attainment, income, employment status, and prior learning experience may also influence participation and completion independently of institutional quality. Without appropriate controls, comparisons across programs may therefore reflect differences in learner composition rather than differences in program performance (Panadero et al., 2025; Wu et al., 2026). Data availability creates another practical challenge. Administrative information on funding and enrollment may be stored by one institution, teaching records by another system, and participant feedback through separate surveys or local databases. Adult and lifelong-learning records are particularly fragmented across providers and administrative systems, limiting the availability of consistent longitudinal information (Desjardins & Kalenda, 2026; Zhang et al., 2026). This fragmentation encourages the continued use of simple indicators because enrollment and completion figures are easier to standardize than multidimensional measures of quality and public value. At the same time, greater data availability does not by itself solve the problem. Accountability measures must have a clear conceptual relationship with program objectives; otherwise, institutions may collect a large number of indicators without producing a more meaningful account of educational performance. A useful evaluation framework therefore needs to balance analytical completeness with interpretability and practical reporting requirements. Against this background, the present study develops an integrated framework for evaluating outcome transparency in publicly funded learning programs. Using approximately 80 publicly funded programs and 18,000 learner records, the study examines accountability through five related dimensions: access equity, instructional quality, completion effectiveness, feedback responsiveness, and public value. These dimensions are organized into an Outcome Transparency Index (OTI) designed to move evaluation beyond enrollment and completion statistics and to show more clearly how institutional activity is connected with learner and public outcomes. Entropy weighting is applied to reduce dependence on subjective indicator weights, while principal component analysis is used to examine whether the proposed indicators form a stable empirical structure. DEA is then used to assess how effectively programs convert financial and institutional resources into educational outcomes. Hierarchical regression examines whether differences in institutional characteristics, learner composition, program scale, and delivery conditions explain variations in outcome transparency, and structural equation modeling is used to test the relationships among reporting quality, instructional performance, learner response, and broader program outcomes.

The study is intended to make both methodological and practical contributions to the evaluation of publicly funded education. Methodologically, it links multidimensional outcome measurement with efficiency analysis and institutional-level explanatory modeling rather than treating funding, educational quality, and reporting as independent issues. It also distinguishes between operational performance and outcome transparency: a program may achieve high completion rates while providing weak evidence on equity or learner experience, whereas another program may use greater resources but generate stronger instructional and public value. Practically, the proposed framework offers funding agencies and educational institutions a structured way to identify where public resources are producing observable benefits and where reporting remains concentrated on administrative activity rather than outcomes. By incorporating access, teaching quality, learner feedback, completion, and public value into the same analytical framework, the study seeks to provide a more informative basis for funding decisions, program improvement, and

public reporting. Its broader significance lies in shifting accountability from the question of how many learners were served toward the more substantive question of what public funding enabled learners and communities to gain.

2. Materials and Methods

2.1 Sample and Study Setting

The study included 80 publicly funded learning programs from community colleges, cultural centers, adult education institutes, public libraries, and vocational training organizations in four urban regions. The programs covered cultural education, community learning, vocational training, and lifelong learning. Stratified sampling was used to include programs with different funding levels, institution types, delivery modes, and learner groups. Programs were included when they had received public funding for at least two years, enrolled at least 100 learners each year, and kept complete records on budgets, enrollment, completion, and learner feedback. Programs with major changes in funding or course structure during the study period were excluded. The final dataset included about 18,000 learner records, 6,500 satisfaction surveys, 1,200 teacher evaluation forms, and 80 budget and performance reports. Learner data included age group, education level, employment status, earlier participation, course type, delivery mode, and completion status.

2.2 Study Design and Comparison Groups

A matched quasi-experimental design was used. Forty programs formed the transparency group, and 40 programs formed the comparison group. Programs were matched by funding level, institution type, program field, learner number, and baseline completion rate. The transparency group used a common reporting form for one academic year. The form required records on access equity, teaching quality, completion, feedback response, and public value. Staff also completed a two-hour training session on data entry and report preparation. The comparison group continued to use its existing reporting methods. Both groups kept their normal teaching and learner support activities. This design was used to test whether a common reporting system improved data quality and reporting clarity without changing course content or funding rules.

2.3 Measures and Quality Control

The Outcome Transparency Index included five areas: access equity, teaching quality, completion results, feedback response, and public value. Access equity was measured through learner background, participation by low-income groups, and enrollment balance. Teaching quality included learner ratings, teacher evaluations, and course delivery standards. Completion results covered completion rate, withdrawal rate, and later participation. Feedback response was measured by reply time, complaint handling, and changes made after learner feedback. Public value included cost per completer, continued learning, skill gains, employment gains, and community benefit. All indicators were converted to the same scale before analysis. Two researchers checked 20% of the records against the original files. Data agreement had to exceed 95%. Cronbach's alpha was used to test survey consistency, and values above 0.70 were accepted. Five experts in education policy and program evaluation reviewed the index. A pilot study with eight programs was used to revise unclear indicators and reporting rules.

2.4 Data Processing and Statistical Models

The data were checked for missing values, duplicate records, extreme values, and errors across

reporting systems. Missing values below 5% were estimated by multiple imputation. Indicators measured on different scales were standardized. Entropy weighting was used to set indicator weights and reduce personal judgment. The weight of indicator j was calculated as:

$$w_j = \frac{1 - e_j}{\sum_{j=1}^m (1 - e_j)}$$

where e_j is the entropy value of indicator j , and m is the total number of indicators. The Outcome Transparency Index for program i was calculated as:

$$OTI_i = \sum_{j=1}^m w_j z_{ij}$$

where z_{ij} is the standardized score of program i for indicator j . Principal component analysis was used to test the structure of the index. Data envelopment analysis measured the relation between funding, staff time, learner numbers, and program results. Hierarchical regression tested the effects of funding level, institution type, learner background, delivery mode, and reporting quality. Structural equation modeling was used to examine the links among funding, teaching quality, learner experience, and public value. Statistical significance was set at $p < 0.05$.

2.5 Group Comparison and Ethical Procedures

Reporting quality was compared between the two groups at baseline and after one academic year. Difference-in-differences analysis was used to estimate the effect of the common reporting form. Program results were also compared across funding levels, institution types, learner groups, and delivery modes. Robustness tests used equal weights, principal component weights, and entropy weights to examine whether program rankings remained stable. Model fit was assessed with CFI, TLI, RMSEA, and SRMR. Program names and learner identities were removed before analysis. All institutions signed data-use agreements. Learners were informed that their records could be used for program evaluation. Individual data were not used for funding cuts, course removal, or staff evaluation. All files were stored on an encrypted server and were available only to the research team.

3. Results and Discussion

3.1 Structure and Distribution of the Outcome Transparency Index

All 80 programs were included in the final analysis. The dataset contained 17,642 learner records, 6,314 satisfaction surveys, 1,176 teacher evaluation forms, and 80 budget reports. Principal component analysis supported the five-part structure of the Outcome Transparency Index. The five dimensions explained 72.6% of the total variance, and Cronbach's alpha was 0.87. The mean index score was 0.54, with values ranging from 0.31 to 0.79. Access equity had the highest mean score of 0.63, followed by teaching quality at 0.59 and completion results at 0.56. Public value scored 0.49, while feedback response had the lowest score of 0.42. These results indicate that most programs reported enrollment and teaching results more clearly than feedback handling and later learner outcomes. Program rankings were similar under entropy, principal component, and equal weighting methods (Qi & Qiao, 2026). Rank correlations ranged from 0.84 to 0.91. Qi and Qiao (2026) also found that multi-part evaluation became more stable when expert review was combined

with entropy weighting. The present study extends this approach by including access, feedback, and public value.

3.2 Effect of the Common Reporting Framework

The two groups had similar baseline index scores. The mean score was 0.47 in the transparency group and 0.48 in the comparison group ($p=0.64$)($p=0.64$)($p=0.64$). After one academic year, the score increased to 0.68 in the transparency group and to 0.52 in the comparison group. Difference-in-differences analysis showed a net increase of 0.17 points (95% CI=0.12–0.22, $p<0.001$). The largest gain was found in feedback response (+0.23), followed by public value (+0.19), teaching quality (+0.14), access equity (+0.09), and completion results (+0.07). The share of reports with complete outcome data increased from 82.4% to 96.1% in the transparency group. The comparison group increased by only 3.8 percentage points (Fig. 1). The smaller change in completion results indicates that reporting rules can improve data quality more quickly than learner outcomes (Su & Wu, 2026). Su et al. (2026) argued that public institutions should combine performance and efficiency measures. The present results support this view and indicate that shared reporting rules are needed before programs can be compared fairly (Peráček & Kaššaj, 2026).

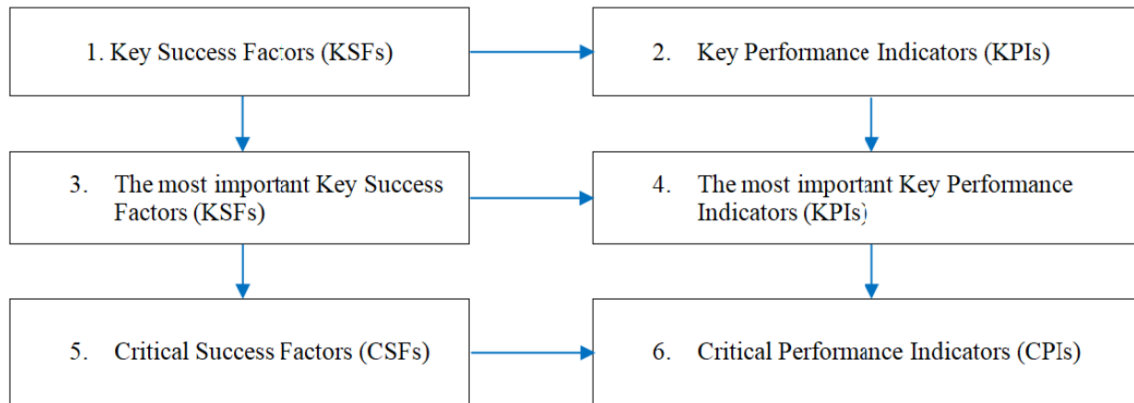


Fig. 1. Changes in outcome transparency between the two program groups.

3.3 Funding Efficiency and Program Outcomes

The mean data envelopment analysis score was 0.78, and 21 programs reached the efficiency frontier. The transparency group had a higher mean efficiency score than the comparison group, with values of 0.84 and 0.73, respectively ($p=0.006$). Medium-funded programs recorded the highest mean efficiency score of 0.82. The scores were 0.79 for highly funded programs and 0.71 for programs with lower funding. A larger budget did not always lead to better results. Some highly funded programs had strong enrollment but weak follow-up participation and high costs per completer. Hierarchical regression showed that reporting quality was related to completion ($\beta=0.29$, $p=0.004$), learner satisfaction ($\beta=0.36$, $p<0.001$), and later participation ($\beta=0.27$, $p=0.009$). Funding level was not significant after teaching quality, learner background, and delivery mode were controlled ($\beta=0.08$, $p=0.21$). The structural model showed acceptable fit (CFI=0.953, TLI=0.944, RMSEA=0.047, SRMR=0.041). Reporting quality was positively related to teaching quality ($\beta=0.41$), feedback response ($\beta=0.34$), and public value ($\beta=0.32$) (Fig. 2). De Bandt et al (2025) found that institution size can affect efficiency comparisons. The present results support this finding because funding scale and program type changed the efficiency estimates (De Bandt et al., 2025).

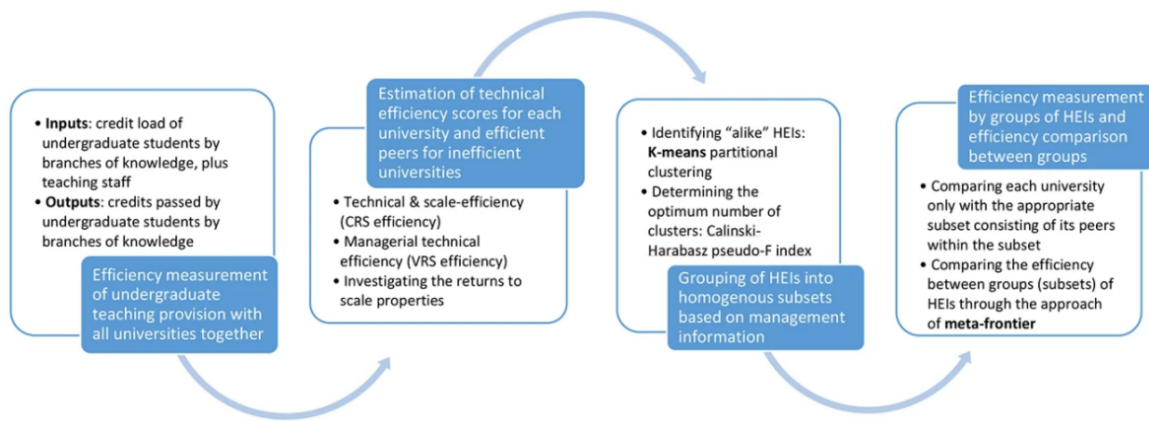


Fig. 2. Relations among funding, reporting quality, learning outcomes, and public value.

3.4 Differences Across Program Types and Practical Use

Program results differed by institution type and delivery mode. Community colleges had the highest completion score of 0.84 but a lower access-equity score of 0.57. Public libraries and cultural centers had a higher access-equity score of 0.71 but a lower completion score of 0.68. Blended programs had the highest overall transparency score of 0.69. The scores were 0.64 for online programs and 0.61 for face-to-face programs. Blended delivery produced more complete digital records while keeping direct contact with learners. However, complete reports did not always indicate strong public value. Several institutions reported activity data but did not include skill gains, continued learning, or changes made after learner feedback. Transparency should therefore cover both data availability and the value of the reported information (Gao et al., 2026). Gao et al. (2026) found that evaluation may become a formal task when institutions collect data only to meet reporting targets. The present results support this concern. An effective accountability system should include learner outcomes, weak results, feedback responses, and later program changes. This study was limited to four urban regions and one academic year. Survey data may also contain self-report bias, and the selected indicator weights may not suit every program type. Future studies should test the index in rural areas, use longer follow-up periods, and compare different funding systems.

4. Conclusion

The study found that a common reporting framework improved outcome transparency in publicly funded learning programs. The Outcome Transparency Index showed clear differences in access equity, teaching quality, completion, feedback response, and public value. Programs that used the shared reporting form showed greater improvement than the comparison group, especially in feedback response and public value. Better reporting was also linked to higher completion rates, stronger learner satisfaction, and greater follow-up participation. Funding level alone did not explain program performance after teaching quality, learner background, and delivery mode were taken into account. The main contribution of this study is a clear framework that links public funding with learning results, learner experience, and reporting quality. The use of entropy weighting, principal component analysis, data envelopment analysis, regression, and structural equation modeling provides a broader view of program performance than enrollment and completion rates alone. The index may help public agencies and education providers compare programs, improve reporting rules, and identify areas that need support. However, the study covered only four urban regions and one academic year. Survey data may contain response bias,

and fixed indicator weights may not suit every program type. Future studies should test the framework in rural areas, over longer periods, and under different funding systems.

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