# Perceived Usefulness of ICT and ICT Self-Efficacy among Public Primary School Administrators in an Arid and Semi-Arid Setting: Evidence from Fafi Sub-County, Kenya

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DOI: 10.29322/IJSRP.16.09.2026.p17720
https://dx.doi.org/10.29322/IJSRP.16.09.2026.p17720

Paper Received Date: 22nd August 2026
Paper Acceptance Date: 12th September 2026
Paper Publication Date: 20th September 2026

**Abstract**

The Technology Acceptance Model treats perceived usefulness as the most dependable attitudinal antecedent of technology adoption, yet the route by which usefulness beliefs reach administrative behaviour has not been established among school administrators working under infrastructural constraint. This study determined the relationship between public primary school administrators' perceived usefulness of ICT and their ICT self-efficacy in Fafi Sub-County, Garissa County, Kenya. A quantitative correlational cross-sectional survey design was adopted, and a census was taken of all 129 administrators serving in the 43 public primary schools of the sub-county; 124 questionnaires were returned in usable form, a response rate of 96.1%. Perceived usefulness was measured with six items adapted from Davis (1989) and ICT self-efficacy with ten items adapted from Compeau and Higgins (1995), both on four-point agreement scales, returning alpha coefficients of .851 and .836. Because the composite scores departed significantly from normality, Spearman's rank-order correlation was used. The analysis returned a positive and statistically significant association of moderate to large magnitude, $r_s(122) = .554$, $p < .001$, 95% CI [.408, .673], and the null hypothesis was rejected; the two variables shared 30.7% of their ranked variance. A follow-up multivariate model qualified the result: once digital literacy was held constant, perceived usefulness no longer predicted self-efficacy, although it retained a significant direct association with ICT integration. Usefulness beliefs therefore travel with confidence but do not appear to manufacture it. The implication for policy is that attitudinal sensitisation should accompany, and not substitute for, competence-based training.

**Keywords:** Perceived usefulness, ICT self-efficacy, school administrators, technology acceptance, arid and semi-arid lands.

## 1. INTRODUCTION

The administration of Kenyan public primary schools has been progressively digitised. Enrolment returns, assessment records, financial reports and routine correspondence with education offices are now expected to move through electronic platforms rather than through paper (Ministry of Education, 2021). The expectation is uniform across the country, but the conditions under which it is met are not. In the arid and semi-arid sub-counties of the north-east, administrators are required to submit the same electronic returns as their counterparts in well-served regions while working with intermittent electricity, restricted connectivity and long distances between schools (Kenya National Bureau of Statistics, 2019). Where the infrastructural environment is thin, the personal attributes that administrators bring to the task carry proportionately greater weight, because there is little in the surrounding system to compensate for their absence.

Among those attributes, beliefs about the value of the technology occupy a central position in the acceptance literature. Perceived usefulness, defined as the degree to which a person believes that using a particular system would enhance job performance, is the construct through which the Technology Acceptance Model explains the decision to adopt (Davis, 1989). Its standing has been repeatedly confirmed in education. A meta-analytic structural equation model of teachers' technology adoption identified perceived usefulness as the most consistent attitudinal antecedent of acceptance (Scherer, Siddiq, & Tondeur, 2019), a conclusion supported by a systematic review of the model's application in educational settings (Granić & Marangunić, 2019).

Evidence from school administration points the same way. Gudek (2019) reported a direct correspondence between administrators' judgements of what ICT can do and the extent to which they used it, and Hong, Chai, Tan, Hasbee and Ting (2015) positioned administrators' perceptions as the gateway through which ICT reaches implementation.

The association, however, is not sufficient for use. A substantial body of work documents favourable attitudes coexisting with limited integration. Ndibalema (2014), surveying 80 administrators across ten secondary schools in Kondoa District, Tanzania, found positive dispositions towards ICT as a management tool alongside a failure to integrate it into administrative functions. Sanchez, Marcos and GuanLin (2012), working with 170 administrators, reported highly favourable attitudes with limited application in management. Mustafina (2016) recorded positive attitudes in a Kazakhstani secondary school, attributed to remote management capability and the visual representation of administrative data, without corresponding integration. Perera, Calkins and Part (2019) identified institutional support, infrastructure, skills and device availability as conditions that must be satisfied before favourable attitudes translate into practice. Ayub, Bakar and Ismail (2015), surveying 187 school administrators in Selangor, Malaysia, reported a positive correlation between attitudes and ICT use alongside a negative correlation between length of administrative service and attitudes.

The persistence of this gap between belief and behaviour points to a variable standing between them. Social Cognitive Theory nominates one. Bandura (1997) holds that behaviour is governed proximally by self-efficacy, the belief in one's capability to execute the actions a situation requires, and that efficacy beliefs are constructed from enactive mastery, vicarious experience, social persuasion and physiological states. Two of these sources are plausibly fed by usefulness beliefs: an administrator who regards a tool as valuable is more likely to attend to colleagues using it successfully and more receptive to persuasive messages about its use. There is therefore a theoretical warrant for expecting perceived usefulness and ICT self-efficacy to move together, and a practical reason for wanting to know whether they do, since capacity-building budgets must be divided between interventions that raise skill and interventions that address beliefs about value.

The literature has not tested that expectation among school administrators. Venkatesh and Bala (2008) specified computer self-efficacy as a determinant of perceived ease of use, which locates efficacy inside the acceptance model but runs the pathway in the opposite direction to the one proposed here. Peng, Abdul Razak and Halili (2023) came closest, reporting that attitudes exert a mediating influence within a model of ICT integration, but their model concerned classroom technology among teachers in a well-resourced province rather than administrative technology among school leaders. Nor has the association been examined in a Kenyan marginalised region, where the practical cost of attempting a digital administrative task is high enough that a belief in the usefulness of ICT may not survive contact with a failed upload. The present study addressed that omission. It was guided by the objective of determining the relationship between school administrators' perceived usefulness of ICT and their ICT self-efficacy in public primary schools in Fafi Sub-County, and it tested, at the .05 level, the null hypothesis that no statistically significant relationship exists between the two.

## 2. METHOD

**Research Design:** The study was conducted within the positivist paradigm using a quantitative correlational cross-sectional survey design, which examines relationships among variables as they occur naturally and is the appropriate choice where the variables of

interest cannot be assigned experimentally (Fraenkel, Wallen, & Hyun, 2019). The design carries a limit acknowledged here at the outset: because both variables were measured at one point in time, the analysis records association and cannot establish that usefulness beliefs preceded confidence.

**Setting and Participants:** The study was conducted in Fafi Sub-County, one of seven sub-counties of Garissa County in north-eastern Kenya, an area classified as arid and semi-arid land and characterised by low and erratic rainfall, a pastoralist economy, dispersed settlement and limited infrastructure. A census was taken of the target population of 129 administrators serving in the 43 public primary schools of the sub-county, comprising equal numbers of head teachers, deputy head teachers and senior teachers; enumerating the whole population removes sampling error entirely. A total of 124 questionnaires were returned in usable form, a response rate of 96.1%, well above the 70% threshold treated as adequate for survey reporting (Fraenkel et al., 2019). Of the respondents, 85 (68.5%) were male, 91.2% were above 30 years of age and 56.4% held a diploma or certificate as their highest professional qualification. The infrastructural profile bears directly on the interpretation of the findings: 58.8% of administrators reported electricity available only sometimes, rarely or never, and 60.5% reported the same for internet access.

**Instrument:** Data were collected using a structured, self-administered questionnaire, the School Administrators' ICT Self-Efficacy and ICT Integration Questionnaire. Perceived usefulness was measured through six items addressing beliefs about the contribution of ICT to the speed of administrative work, the accuracy of records and reports, the manageability of tasks, administrative effectiveness, communication with stakeholders and the overall usefulness of ICT for daily school administration; the items were adapted from Davis (1989), with the referent changed from general job performance to school administrative tasks. ICT self-efficacy was measured through ten items adapted from Compeau and Higgins (1995). Following Bandura's (1997) guidance that efficacy items should specify the conditions under which performance is to be judged, the items asked about confidence in performing administrative ICT tasks when no guidance is available, when the task is unfamiliar, when the administrator is under time pressure and when minor technical difficulties arise, as well as confidence in learning a demonstrated task, selecting appropriate tools and supporting other staff. Both sections used a four-point agreement scale. The self-efficacy items are distinct in wording and referent from the skill items elsewhere in the instrument, which record what the administrator can do rather than how confident he is about doing it.

**Validity and Reliability:** Content validity was established through review by specialists in educational technology and educational administration. Construct validity was supported by principal component analysis: for the perceived usefulness scale the Kaiser-Meyer-Olkin measure was .721 and Bartlett's test was significant, $\chi^2(15) = 58.541$, $p < .001$, and a single dominant component was extracted with loadings from .673 to .869, confirming that the six items measure one construct. A pilot was conducted with 15 administrators in the neighbouring Lagdera Sub-County. No item fell below the corrected item-total correlation criterion of .30, and Cronbach's alpha was .851 for perceived usefulness and .836 for ICT self-efficacy (Nunnally & Bernstein, 1994). Composite scores were computed as the mean of the constituent items.

**Procedure and Ethics:** Data collection followed ethical clearance from the Institutional Scientific Ethics and Review Committee, a research licence from the National Commission for Science, Technology and Innovation, and authorisations from the university and the county education and administrative offices. Administrators were briefed on the purpose of the study, their rights and the confidentiality arrangements, and gave written consent before completing the questionnaire, which was distributed during pre-arranged school visits and collected under a drop-and-pick arrangement over four weeks.

**Data Analysis:** Data were analysed using SPSS version 26. Normality was assessed using the Kolmogorov-Smirnov test as the primary criterion, since the dataset exceeded 100 cases, supplemented by the Shapiro-Wilk test (Field, 2018). Both returned significance values below .05 for perceived usefulness and for ICT self-efficacy, so the bivariate normality assumption underlying the product-moment coefficient was not satisfied and Spearman's rank-order correlation was used instead, since it requires only that

the relationship be monotonic. Monotonicity was tested rather than assumed through inspection of the scatter plot, which showed no curvilinearity, floor or ceiling clustering, or influential outliers. Effect sizes were interpreted using the conventions of Cohen (1988), and the 95% confidence interval was computed using the Fisher transformation with the variance correction recommended for rank-order coefficients by Bonett and Wright (2000). Multiple linear regression was used subsequently to establish whether the bivariate association survived the introduction of the administrators' measured digital skill.

## 3. RESULTS AND DISCUSSION

The question addressed by this analysis was: what is the relationship between school administrators' perceived usefulness of ICT and their ICT self-efficacy in public primary schools in Fafi Sub-County?

**Perceived Usefulness of ICT:** Table 1 presents the descriptive statistics for the six perceived usefulness items. Item means ranged from 2.52 to 2.91 and the composite mean was 2.82 (SD = 0.71), above the scale midpoint of 2.50. Administrators therefore agreed on the whole that ICT is useful for daily school administration. The internal pattern is more informative than the aggregate. The strongest endorsement attached to the contribution of ICT to administrative effectiveness (M = 2.91) and to its overall usefulness (M = 2.90), while the weakest attached to its contribution to the speed of completing administrative work (M = 2.52), the only item to approach the midpoint. Administrators accept that ICT improves the quality of what they produce while doubting that it makes the work faster, a distinction entirely consistent with the friction of operating digital tools where power and connectivity are intermittent.

**Table 1**

*Descriptive Statistics for Perceived Usefulness of ICT (N = 124)*

| Item | Min | Max | *M* | *SD* |
|---|---|---|---|---|
| Using ICT helps me complete school administrative work more quickly | 1 | 4 | 2.52 | 0.86 |
| Using ICT improves the quality and accuracy of school records and reports | 1 | 4 | 2.84 | 0.79 |
| ICT makes administrative tasks easier to manage | 1 | 4 | 2.88 | 0.74 |
| Using ICT enhances my effectiveness in school administration | 1 | 4 | 2.91 | 0.81 |
| ICT improves communication with teachers, parents and education offices | 1 | 4 | 2.88 | 0.74 |
| Overall, ICT is useful for managing the daily administration of the school | 1 | 4 | 2.90 | 0.72 |
| **Composite: perceived usefulness of ICT** | **1** | **4** | **2.82** | **0.71** |

*Note.* Response scale: 1 = strongly disagree to 4 = strongly agree. Scale midpoint = 2.50.

**ICT Self-Efficacy:** The composite mean for ICT self-efficacy was 2.75 (SD = 0.52), slightly above the scale midpoint, indicating moderate confidence in using ICT for administrative tasks. Confidence was highest for using ICT when no one is available to give guidance (M = 3.07) and for learning a task that has been demonstrated (M = 2.87). It was lowest by a clear margin for using ICT under time pressure (M = 2.22), the only item to fall below the midpoint and one of the two most widely dispersed items (SD = 0.99). The pattern is diagnostically important. Administrators' confidence is weakest in precisely the conditions under which

administrative ICT use matters most, namely deadline-bound returns to education offices, which is where a failure to proceed digitally has the greatest consequence for the school.

**Relationship between Perceived Usefulness and ICT Self-Efficacy:** Spearman's rank-order correlation returned a positive and statistically significant relationship of moderate to large magnitude, $r_s(122) = .554$, $p < .001$, 95% CI [.408, .673]. The null hypothesis was therefore rejected. Table 2 presents the coefficient matrix. The confidence interval excludes zero and lies entirely within the moderate to large range by the conventions of Cohen (1988), so the association is not merely detectable but substantial, and the interval is narrow enough that the finding does not rest on a borderline test. Perceived usefulness and ICT self-efficacy shared 30.7% of their ranked variance.

**Table 2**

*Spearman's Correlation between Perceived Usefulness of ICT and ICT Self-Efficacy (N = 124)*

| | | Perceived usefulness | ICT self-efficacy |
|---|---|---|---|
| Perceived usefulness | Correlation coefficient | 1.000 | .554** |
| | Sig. (2-tailed) | | .000 |
| | N | 124 | 124 |
| ICT self-efficacy | Correlation coefficient | .554** | 1.000 |
| | Sig. (2-tailed) | .000 | |
| | N | 124 | 124 |

*Note.* ** Correlation is significant at the .01 level (2-tailed). 95% CI [.408, .673]; shared ranked variance = 30.7%.

Substantively, administrators who believed that ICT improves the speed, accuracy and effectiveness of administrative work also expressed greater confidence in their capacity to use it. The finding accords with the Technology Acceptance Model, in which usefulness beliefs drive engagement with technology (Davis, 1989; Scherer et al., 2019; Venkatesh & Davis, 2000), and with the social persuasion and vicarious components of Bandura's (1997) account of efficacy formation, since administrators who value a tool are more likely to attend to models of its successful use. It agrees with Gudek (2019) and with Hong et al. (2015), and it extends to administrators in a marginalised region a relationship established largely in better-resourced systems and largely among teachers.

**Qualification from the Multivariate Model:** The bivariate result does not stand unqualified, and reporting it alone would misrepresent what the data support. When ICT self-efficacy was regressed simultaneously on perceived usefulness and the administrators' measured digital literacy, perceived usefulness ceased to predict self-efficacy, $\beta = -.134$, $p = .159$, with a confidence interval including zero, while digital literacy remained the only significant unique predictor. Perceived usefulness nevertheless retained a significant direct association with the frequency of ICT integration in administrative tasks, $\beta = .252$, $p = .013$.

Two conclusions follow. The first is that usefulness beliefs and digital skill travel together in this population, and that where the two diverge it is skill, not belief, that sustains confidence. Bandura (1997) anticipates exactly this ordering: enactive mastery is the principal source of efficacy information, and persuasion and vicarious experience are secondary sources whose contribution is contingent on the person having something to be persuaded about. An administrator may be wholly convinced that electronic returns are superior to paper ones and still have no basis for believing that he can produce one. The second conclusion is that belief nonetheless does independent work: it sustains the motivation to use ICT even where it does not build confidence, which is why the direct pathway to integration survives the introduction of skill into the model. The pattern echoes Perera et al. (2019), who cautioned that favourable attitudes cannot deliver integration without skills, infrastructure and support, and it qualifies accounts of adoption that locate the whole mechanism in attitude.

Read together with the descriptive profile, the results also suggest why the attitude-behaviour gap documented by Ndibalema (2014), Sanchez et al. (2012) and Mustafina (2016) is so persistent. In this population the belief in usefulness was highest for the quality of administrative output and lowest for its speed, while confidence was lowest under time pressure. Belief and confidence fail in the same place. An administrator convinced that ICT produces cleaner records but doubtful that it produces them faster, and least confident of managing the technology when a deadline is running, has every reason to revert to paper at the moment of pressure. Attitudes are not insincere in such cases; they are simply not the binding constraint.

## 4. CONCLUSION AND IMPLICATIONS

Perceived usefulness of ICT and ICT self-efficacy are positively and substantially associated among public primary school administrators in Fafi Sub-County. Administrators who regard ICT as an instrument that improves the accuracy, manageability and effectiveness of administrative work are also more confident of their capability to use it, and the association is strong enough, and estimated precisely enough, to be treated as a stable feature of this population rather than an artefact of the sample. The multivariate evidence, however, locates the source of confidence in demonstrated competence rather than in belief. Usefulness beliefs accompany confidence without appearing to produce it, while independently sustaining the motivation to use ICT in administration.

The practical implication is a matter of sequencing rather than of choosing. Capacity-building programmes for school administrators in arid and semi-arid settings should be built on hands-on, task-based training in the administrative functions the schools are actually required to perform electronically, since it is competence that raises the confidence on which use depends. Sensitisation that demonstrates concrete administrative benefits, such as faster returns, cleaner financial records and easier communication with education offices, should accompany that training because usefulness beliefs carry independent motivational weight, but it should not be delivered in place of it. A programme that persuades administrators of the value of ICT without equipping them to use it under time pressure will produce willing administrators who continue to file on paper.

Three limitations bound these conclusions. The study was confined to one sub-county, so generalisation beyond comparable arid and semi-arid settings requires caution, although the census design removes sampling error within the study area. The cross-sectional design records association at a single point in time and cannot establish that belief preceded confidence. Both constructs were measured by self-report, which exposes the estimates to social desirability and common method influences; anonymity, established scale formats and the separation of instrument sections were used to reduce that exposure, and a formal assessment of common method variance is recommended for replication. Longitudinal and intervention designs are required to establish whether raising usefulness beliefs changes administrative confidence, or whether, as these data suggest, the causal traffic runs through skill.

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