International Journal of Multidisciplinary Research and Growth Evaluation.

The Relationship between Knowledge, Skills, and Attitudes: A Thematic Review of Competence Development in Education and Practice

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Article Info

ISSN (Online): 2582-7138
Volume: 07
Issue: 06
Received: 27-08-2026
Accepted: 29-09-2026
Published: 31-10-2026
Page No: 216-224

Abstract
Knowledge, skills and attitudes appear side by side in curriculum documents, job descriptions and competence frameworks, but the way they relate to one another is rarely examined in its own right. Policy tends to treat them as three separate boxes to tick. Experience in classrooms and workplaces points to something messier: each depends on the others. This non-empirical article examines that relationship and asks what it means for education and professional development, with particular reference to Uganda's move towards competence-based education. It draws on social cognitive theory, the theory of planned behaviour and experiential learning theory, read against Bloom's familiar division of learning into cognitive, psychomotor and affective domains. Through an integrative review of peer-reviewed studies and policy documents published between 2020 and 2026, analysed with Braun and Clarke's reflexive thematic analysis, six themes are developed: knowledge as the foundation of skilled action; skills as knowledge made operational through practice; attitudes as the motivational gatekeeper of performance; the reciprocal and cyclical interaction of the three; the moderating role of context; and the integration of the three in current competence frameworks. The relationship turns out to be neither linear nor additive. Knowledge is necessary for skill but does not produce it, skill does not guarantee use, and attitudes both shape and are shaped by what people know and can do. Ugandan evidence on curriculum implementation, graduate employability and health worker practice shows that the gap between what people know, what they can do and what they are willing to do is still a central problem. We conclude that curriculum design, teaching, assessment and staff development should treat knowledge, skills and attitudes as one integrated system, and we offer recommendations for policy makers, institutional leaders, educators and learners.

Keywords: knowledge, skills, attitudes, competence, competence-based curriculum, thematic analysis, social cognitive theory, theory of planned behaviour, experiential learning, Uganda

Introduction

Few phrases are used as often in education and human resource policy as "knowledge, skills and attitudes". Curriculum frameworks promise to develop them, professional bodies build standards around them, and employers complain when graduates seem to lack one or more of them. The phrase is now so familiar that its meaning is seldom questioned. Behind it, though, sits a real theoretical question. How are knowledge, skills and attitudes related, and how does that relationship produce competent performance? The answer matters in practice, because the way educators and managers understand the relationship shapes what they teach, how they assess and where they spend limited resources.

Recent global developments have sharpened the question. The World Economic Forum (2025) [30] reports that employers expect close to two fifths of core skills in the labour market to change by 2030, and that analytical thinking, resilience, flexibility, curiosity and a commitment to lifelong learning are among the capabilities growing fastest in importance. Several of these are

less technical skills than dispositions and attitudes. The Organisation for Economic Co-operation and Development makes a similar argument: people need knowledge and cognitive skills, but they also need the motivation and attitudes that keep them learning throughout life (OECD, 2021, 2023) [18, 19]. UNESCO (2021) [28] has gone further, calling for a new social contract for education in which values, relationships and shared responsibility stand alongside knowledge and skill. Generative artificial intelligence adds another layer. When a tool can supply information instantly, the weight shifts from recalling knowledge to the judgement and ethical attitudes with which it is used (Miao & Holmes, 2023) [13].

In Uganda these debates became concrete with the rollout of the competence-based lower secondary curriculum from 2020. The reform aims to move teaching away from memorising content and towards the development of competences, generic skills and values (National Curriculum Development Centre [NCDC], 2020) [16], and it forms part of the human capital agenda of the Third National Development Plan (National Planning Authority [NPA], 2020) [17]. Early implementation studies tell a mixed story. Teachers welcome the emphasis on skills and learner-centred teaching, yet they report inadequate resources, limited training and, in some cases, negative attitudes towards the reform itself (Namubiru *et al*., 2024) [15]. Schools serving poorer communities have found it hardest, which raises questions of equity (Barasa *et al*., 2025) [3]. In higher education, Ugandan employers and students still disagree about which employability skills matter most, although both name a positive attitude as essential and often missing (Tagulwa *et al*., 2023) [26].

The relationship between knowledge, skills and attitudes is therefore far from an abstract matter. It helps decide whether curriculum reforms work, whether graduates find and keep jobs, and whether professionals act on what they know. Much of the literature, however, looks at one element at a time, or lists the three in parallel instead of treating them as parts of a single capability. A focused conceptual synthesis that brings recent evidence together and asks directly how the three relate is still missing.

This article attempts that synthesis. It examines the relationship between knowledge, skills and attitudes through a theoretically grounded integrative review and thematic analysis of literature published between 2020 and 2026, and it draws out implications for education and professional development, with particular attention to Uganda. The paper is organised as follows. Section 2 presents the theoretical framework and Section 3 clarifies the key concepts and policy context. Section 4 explains the review approach and the thematic analysis procedure. Section 5 presents the six themes, and Section 6 considers what they mean for teaching, assessment and policy. Section 7 offers the discussion and recommendations, and Section 8 concludes with directions for future research.

Theoretical Framework

Bloom's Domains of Learning as a Point of Departure

Most discussions of knowledge, skills and attitudes trace back, directly or not, to the taxonomy of educational objectives developed by Bloom and his colleagues. The taxonomy divided learning into three domains: a cognitive domain covering knowledge and intellectual abilities, a psychomotor domain covering physical and practical skills, and an affective domain covering feelings, values and attitudes (Bloom, 1956) [4]. It gave educators a common language, and many learning outcome statements in Ugandan and international curricula still rest on it. For this paper, its strength is also its weakness. Because it separates learning into domains, it makes it easy to plan, teach and assess each one in isolation. The three theories that follow were chosen because each explains a link between the domains that the taxonomy leaves unstated.

Social Cognitive Theory and Self-Efficacy

Social cognitive theory, first developed by Albert Bandura, sees human functioning as the result of reciprocal interaction between personal factors, behaviour and the environment. Schunk and DiBenedetto (2020) [23] explain that, within this model, people acquire knowledge and skill through observation, practice and feedback. Their beliefs about their own capability, known as self-efficacy, then decide whether they attempt a task, how hard they try and how long they keep going when it becomes difficult. Self-efficacy is itself an attitude, an attitude towards the self. It grows mainly out of mastery experiences, that is, out of using knowledge and skill successfully.

What makes social cognitive theory useful here is that it describes a loop rather than a straight line. Knowledge and skill lead to successful performance; success raises self-efficacy; and stronger self-efficacy brings more effort and further learning. The theory also puts the environment inside the relationship, which helps explain why the same knowledge and skill are used in one setting and left idle in another.

The Theory of Planned Behaviour

The theory of planned behaviour, developed by Icek Ajzen, proposes that behaviour follows from an intention to act, and that intention depends on three things: attitude towards the behaviour, subjective norms (what important others are thought to expect) and perceived behavioural control (how easy or hard the behaviour seems). In a recent restatement, Ajzen (2020) [2] makes clear that knowledge and skills enter the model mainly through perceived and actual control. Someone without the necessary knowledge or skill is unlikely to act, however favourable their attitude. Someone who has both, but holds an unfavourable attitude or faces discouraging social norms, may still decide not to act.

The theory helps with a familiar puzzle in education and professional life: people who plainly know what to do, and are able to do it, sometimes do not. It locates attitudes and norms at the exact point where capability turns into action.

Experiential Learning Theory

Experiential learning theory, associated with David Kolb, describes learning as a cycle that moves from concrete experience to reflective observation, abstract conceptualisation and active experimentation. In a systematic review of the model, Morris (2020) [14] argues that experience produces learning best when it is rich in context, involves real problems and is followed by critical reflection. He proposes a revised cycle in which learners meet concrete experiences in context, reflect on them critically, form contextualised abstract ideas and then test those ideas through pragmatic experimentation.

The theory accounts for the conversion of knowledge into skill, and of skill back into deeper knowledge. It also helps explain how attitudes change. Reflecting on experience often

shifts what learners value and how they see themselves, so the cycle develops attitudes alongside knowledge and skill.

Bringing the Theories Together

In this paper the three theories serve as complementary lenses laid over Bloom's domains. Bloom supplies the names for the three elements. Experiential learning theory explains how knowledge and skill grow into one another through practice and reflection. Social cognitive theory explains how successful performance shapes attitudes towards the self, and how those attitudes feed back into learning. The theory of planned behaviour explains how attitudes and social norms decide whether knowledge and skill become action. Read together, they suggest that knowledge, skills and attitudes work as an interacting system, not as three separate stores, and they provide the analytical categories used in the thematic analysis below.

Conceptual Clarification and Policy Context

Defining Knowledge, Skills and Attitudes

Knowledge refers to the facts, concepts, principles, theories and procedures that a person understands and can recall or reason with. Cognitive psychology separates declarative knowledge, knowing that something is the case, from procedural knowledge, knowing how to do something. Kirschner and Hendrick (2020) [10] point out that what learners already know is the strongest single influence on what they can learn next, since new information is made sense of through knowledge structures already held in long-term memory.

Skills refer to the ability to apply knowledge in order to carry out tasks and solve problems. Some are cognitive, such as critical thinking and problem solving. Some are practical or technical, such as operating equipment or performing a clinical procedure. Others are social and interpersonal, such as communication and teamwork. A skill differs from knowledge in that it shows itself in performance and improves with practice and feedback (Tushar & Sooraksa, 2023) [27].

Attitudes refer to fairly stable evaluations, beliefs and dispositions that lead a person to respond favourably or unfavourably to an object, activity, person or idea. In education and work they include motivation, curiosity, openness, responsibility, integrity, respect for others and beliefs about one's own ability. Ajzen (2020) [2] treats attitude as one of the immediate causes of intention and action.

Competence is the word most often used for the three in combination. The European digital competence framework, for example, defines each of its competences as a set of knowledge, skills and attitudes and gives examples of all three for every competence area (Vuorikari *et al*., 2022) [29]. That definition captures the central idea of this paper: competence is not three separate parts added together but their joint use in a real situation.

Knowledge, Skills and Attitudes in Contemporary Frameworks

Recent international and national frameworks broadly agree that knowledge, skills and attitudes have to be developed together, even if they weight them differently. Table 1 summarises how selected frameworks relevant to Uganda and beyond treat the three elements.

Table 1: Selected Frameworks and Their Treatment of Knowledge, Skills and Attitudes

Framework	Source	Treatment of Knowledge, Skills and Attitudes
Lower Secondary Curriculum Framework, Uganda	NCDC (2020) [16]	Organizes learning around competences, generic skills and values, and seeks a shift from the recall of content to its application and to character formation.
Third National Development Plan, Uganda	NPA (2020) [17]	Links education to human capital development and stresses skills relevant to production, employment and national transformation.
DigComp 2.2 Digital Competence Framework	Vuorikari *et al*. (2022) [29]	Defines every competence explicitly through examples of knowledge, skills and attitudes, treating the three as parts of one capability.
OECD Skills Outlook	OECD (2021, 2023) [18, 19]	Emphasizes lifelong learning, positive attitudes towards learning, and combined skills for the green and digital transitions.
Reimagining Our Futures Together	UNESCO (2021) [28]	Places values, relationships and shared responsibility alongside knowledge and skills in a new social contract for education.
Future of Jobs Report 2025	World Economic Forum (2025) [30]	Ranks analytical thinking, resilience, flexibility, curiosity and lifelong learning among the core skills rising in importance to 2030.

The frameworks point to a change in thinking. Older curricula concentrated on content knowledge and assumed that skills and attitudes would follow. Current frameworks put attitudes and values on the same level as knowledge and skills and insist that the three be integrated. Implementation studies in Uganda and elsewhere show, however, that the language of integration in policy still sits alongside a good deal of fragmentation in classrooms and workplaces (Evans *et al*., 2020; Namubiru *et al*., 2024) [9, 15].

Review Approach and Thematic Analysis Procedure

Design

The paper is non-empirical. It uses an integrative literature review design, which suits questions that call for theoretical and empirical work from different traditions to be brought together into a new conceptual understanding (Kraus *et al*., 2022) [11]. One question guided the review: what does recent literature tell us about how knowledge, skills and attitudes relate in the development of competent performance?

Sources and Selection

We searched Scopus, Web of Science, ERIC, Google Scholar and African Journals Online, and added material from the websites of the OECD, UNESCO, the World Economic Forum, the European Commission and Ugandan policy bodies. Search strings combined "knowledge", "skills", "attitudes" and "competence" with terms such as "relationship", "integration", "self-efficacy", "competence-based curriculum", "employability", "knowledge attitude practice" and "Uganda". The review was restricted to work published between 2020 and 2026. The one exception is Bloom's (1956) [4] taxonomy, kept because the three-domain vocabulary originates there. To be included, a source had to be a peer-reviewed article, a systematic or meta-analytic

review, or an authoritative policy report, and it had to deal with at least two of the three elements or the links between them. Well-cited international work and studies from Uganda and East Africa were given priority. The final corpus is the set of sources listed in the references.

Thematic Analysis

The corpus was analysed using reflexive thematic analysis as set out by Braun and Clarke (2021, 2022) [5, 6], in six phases. We began by familiarising ourselves with the sources through repeated reading and note taking. We then coded every passage that described a link between knowledge, skills and attitudes, using codes such as "knowledge enables skill", "attitude blocks use of knowledge" and "success raises confidence". Related codes were next grouped into candidate themes. These were checked against the coded extracts and the whole corpus to make sure that each told a coherent story and that the themes did not overlap. Each theme was then defined and named, and finally written up with its supporting evidence. Consistent with the reflexive approach, we regard themes as patterns of shared meaning that the researchers actively constructed, not as findings that simply emerged from the data. The theoretical framework informed the analysis without confining it, which left room to recognise themes the theories had not anticipated.

Rigour and Limitations

To support credibility, the four authors discussed the analysis at every phase, returned to the original sources to confirm interpretations and looked deliberately for evidence that contradicted each theme. The review has its limits. It is not a systematic review and does not claim to be exhaustive. It relies on published literature, in which African and Ugandan evidence may be under-represented, and on the authors' interpretation. We have tried to address these limits by being transparent about the procedure and by calling, in the conclusion, for empirical work to follow.

Thematic Analysis: How Knowledge, Skills and Attitudes Relate

Six themes were developed. Each is presented below with its supporting evidence, and all six are summarised in Table 2 at the end of the section.

Table 2: Summary of Themes on the Relationship between Knowledge, Skills and Attitudes

Theme	Core Proposition	Key Supporting Sources
1. Knowledge as the foundation of skilled action	Organised knowledge in long-term memory underpins skill; knowledge is necessary but not sufficient for practice.	Sweller (2020) [25]; Kirschner & Hendrick (2020) [10]; Olum *et al*. (2020) [20]; Zhong *et al*. (2020) [32]
2. Skills as knowledge made operational	Knowledge becomes skill only through application, feedback and reflection; practice in turn deepens knowledge.	Morris (2020) [14]; Darling-Hammond *et al*. (2020) [8]; Abelha *et al*. (2020) [1]; Tagulwa *et al*. (2023) [26]
3. Attitudes as motivational gatekeeper	Attitudes, norms and perceived control decide whether knowledge and skill are acquired and used.	Ajzen (2020) [2]; Ryan & Deci (2020) [22]; Namubiru *et al*. (2024) [15]; Yeager & Dweck (2020) [31]
4. Reciprocal and cyclical interaction	Success builds self-efficacy and positive attitudes, which drive further learning; failure can start negative cycles.	Schunk & DiBenedetto (2020) [23]; OECD (2021) [18]; World Economic Forum (2025) [30]
5. Context as moderator	Resources, assessment, culture and social norms shape how the three elements develop and are applied.	Barasa *et al*. (2025) [3]; Evans *et al*. (2020) [9]; Ajzen (2020) [2]
6. Integration in competence frameworks	Contemporary frameworks treat knowledge, skills and attitudes as inseparable aspects of competence.	Vuorikari *et al*. (2022) [29]; Redman & Wiek (2021) [21]; Tushar & Sooraksa (2023) [27]; Miao & Holmes (2023) [13]

Theme One: Knowledge as the Foundation of Skilled Action

The first theme is that knowledge is the foundation on which skills are built. The literature agrees that skilled performance rests on a well-organised base of knowledge held in long-term memory. Sweller (2020) [25], writing from cognitive load theory, explains that working memory is very limited when handling new information but almost unlimited when it draws on organised knowledge already stored in long-term memory. Experts handle complex tasks fluently not because they have superior general thinking skills but because rich knowledge structures let them recognise problems and retrieve suitable responses. Kirschner and Hendrick (2020) [10] apply the same point to the classroom. Critical thinking and problem solving cannot be taught in a vacuum, since nobody can think critically about a subject they know little about.

This theme runs against a view heard in some debates on competence-based education, namely that knowledge matters less now that information is freely available. The literature suggests otherwise. Searching for information, judging it and using it all depend on prior knowledge. In their systematic review of competency-based education, Evans *et al*. (2020) [9] note that successful programmes set clear knowledge targets within each competence instead of replacing knowledge with generic skills.

Knowledge is necessary, then, but it is not enough. The clearest evidence comes from health research on knowledge, attitudes and practices. Early in the COVID-19 pandemic, Zhong *et al*. (2020) [32] found that residents with better knowledge were more likely to hold positive attitudes and follow preventive practices, which confirms a link, yet knowledge on its own did not guarantee practice. In Uganda, Olum *et al*. (2020) [20] found that 69% of health workers at Makerere University teaching hospitals had sufficient knowledge of COVID-19 and 74% reported good practices, while only 21% held a positive attitude. Knowledge and practice moved together here while attitude trailed behind. The result is a useful warning against assuming that the three elements develop in step.

Theme Two: Skills as Knowledge Made Operational Through Practice

The second theme concerns how knowledge becomes skill. Study after study shows that this does not happen on its own. It takes practice, application in realistic settings, feedback and reflection. Morris (2020) [14] argues that learning from

experience depends on experiences that are rich in context and critically reflected upon, and that abstract ideas only become useful once learners test them in practice. Darling-Hammond *et al*. (2020) [8], drawing on the science of learning and development, reach a similar conclusion: learners build transferable skills when they apply knowledge to meaningful problems, get timely feedback and have the chance to revise their work.

Research on graduate employability shows what happens when this conversion is neglected. In their systematic review, Abelha *et al*. (2020) [1] found that higher education institutions often pass on disciplinary knowledge well but pay too little attention to its application, so graduates leave with knowledge they struggle to use at work. Succi and Canovi (2020) [24] found that employers valued soft skills such as teamwork, communication and the ability to learn more highly than students did, which suggests that students underrate the need to practise these skills while still studying. The Ugandan picture is similar. Tagulwa *et al*. (2023) [26] found statistically significant differences between students' and employers' views of the most important employability skills. Employers stressed practical application, creativity and innovation, and the authors recommended closer partnerships with industry and more field-based learning.

Practice also deepens knowledge. When learners use what they know, they find the gaps, correct misconceptions and connect ideas they had learned separately. Skill is therefore both a product of knowledge and a route to sturdier knowledge, a two-way movement that experiential learning theory describes well.

Theme Three: Attitudes as the Motivational Gatekeeper of Performance

The third theme may carry the most weight. Attitudes decide whether knowledge and skills are acquired at all, and whether they are used once acquired. Ajzen (2020) [2] shows that attitude towards a behaviour, together with social norms and perceived control, predicts the intention to carry it out. A teacher may understand the principles of learner-centred teaching and have the skills to run group work, yet if he or she believes such methods waste time or weaken authority, that knowledge and skill will sit unused.

Uganda's curriculum reform offers a clear case. Namubiru *et al*. (2024) [15] surveyed 365 teachers and 32 administrators in Bundibugyo and Ntoroko districts. Although respondents appreciated the curriculum's emphasis on skills and real-world application, their overall attitude towards implementation was negative. The authors traced this attitude to inadequate resources and limited training, but once formed, the attitude became a barrier in its own right. It acted as a gate that knowledge and skill had to pass through before they could change what happened in the classroom.

Self-determination theory takes the point further. Ryan and Deci (2020) [22] show that people engage more deeply, persist longer and apply what they learn more readily when they experience autonomy, competence and relatedness. When these needs are frustrated, motivation becomes controlled or disappears, and learning stays on the surface. Positive attitudes to learning are therefore not just personal traits. They are shaped by the way learning environments are designed.

Research on mindsets extends the theme to beliefs about ability. Yeager and Dweck (2020) [31] argue that a growth mindset, the belief that ability can be developed, encourages learners to take on challenges and learn from their mistakes. The evidence on mindset interventions is contested. Macnamara and Burgoyne (2023) [12] found small average effects on academic achievement and raised concerns about study quality, whereas Burnette *et al*. (2023) [7] found larger effects for students at academic risk and where interventions were well implemented. The debate itself supports the theme. Attitudes matter, but a brief message will not change them. They need to be backed by real experiences of success and by environments that reward effort and learning.

Theme Four: Reciprocal and Cyclical Interaction

The fourth theme is that the three elements influence one another in both directions and in cycles, not along a single line. The traditional knowledge, attitude, practice model assumes a fixed order in which knowledge changes attitudes and attitudes change practice. The literature reviewed here departs from that order in many places. Schunk and DiBenedetto (2020) [23] describe mastery experiences, the successful use of knowledge and skill, as the strongest source of self-efficacy. Skill, in other words, can change attitude. A nursing student who performs a procedure successfully under supervision gains confidence, and that confidence makes the student more willing to practise, look for further knowledge and take responsibility.

Attitudes, in turn, drive the search for knowledge. Curious learners who value a subject read more widely, ask more questions and remember more. The World Economic Forum (2025) [30] lists curiosity and lifelong learning among the fastest-rising skills for exactly this reason: such attitudes keep knowledge and skill growing. The OECD (2021) [18] makes a similar case, arguing that the motivation to keep learning underpins adult skills development and that adults with positive attitudes towards learning take part in far more further training.

The cycle can also turn downwards. Repeated failure lowers self-efficacy, lower self-efficacy reduces effort, and reduced effort brings more failure. Teachers who have not been trained in a new curriculum may struggle in their first lessons, form negative views of the reform and then avoid the very practice that would have built their skill. The Ugandan implementation studies show this pattern, with inadequate training, weak early experiences and negative attitudes feeding one another (Namubiru *et al*., 2024) [15]. Interventions should therefore aim to set positive cycles in motion, for instance by giving learners and teachers early, well-supported experiences of success.

Theme Five: Context as Moderator of the Relationship

The fifth theme is that the setting in which people learn and work shapes how knowledge, skills and attitudes relate. Social cognitive theory places the environment inside the model, and the theory of planned behaviour gives explicit weight to social norms and perceived control. The literature shows that resources, workload, organisational culture, assessment systems and social expectations all influence whether knowledge and skill are developed and used.

Barasa *et al*. (2025) [3] provide a Ugandan example. In their study of the lower secondary competence-based curriculum, well-resourced schools managed to adapt to the reform, while schools serving low socioeconomic communities struggled with infrastructure, teacher preparation and learning materials. In those conditions even teachers with the right knowledge and positive attitudes had little perceived or actual

control over their teaching. The authors warn that without targeted support the reform could widen inequality instead of reducing it.

Assessment is a large part of this context. Where high-stakes examinations reward the recall of knowledge, teachers and learners sensibly focus on content, and skills and attitudes are pushed aside whatever the curriculum says. Evans *et al.* (2020) [9] found that competency-based programmes work when assessment is aligned with competences and learners can show mastery in a variety of ways. Culture matters as well. Where questioning authority is frowned upon, learners may have the knowledge and skill to offer ideas but hold attitudes, formed by social norms, that keep them quiet.

The theme is a caution against explaining the gap between knowledge and practice purely as an individual failing. Often the gap reflects a setting that makes applying knowledge and skill hard or unrewarded.

Theme Six: Integration Within Contemporary Competence Frameworks

The sixth theme concerns the growing habit of treating knowledge, skills and attitudes as inseparable parts of competence. Vuorikari *et al.* (2022) [29] define each digital competence through examples of all three. Redman and Wiek (2021) [21], reviewing sustainability competencies, argue that competence is the ability to perform well in real situations by drawing on knowledge, skills and attitudes together, and that the three cannot be meaningfully separated when learners tackle complex problems. The OECD (2023) [19] likewise holds that the green and digital transitions call for combinations of technical knowledge, transferable skills and attitudes such as openness and responsibility.

In a semi-systematic review of global employability skills, Tushar and Sooraksa (2023) [27] found that employers look for integrated bundles of hard and soft skills together with personal qualities such as adaptability, integrity and a positive work attitude, and that the weight given to each varies by sector and region. Generative artificial intelligence strengthens the case for integration. Miao and Holmes (2023) [13] argue that as artificial intelligence tools take over some of the work of retrieving and processing information, human value lies more and more in judging information critically, using tools ethically and taking responsibility for decisions. Each of these capabilities combines knowledge, skill and attitude, and none can be reduced to just one of them.

Here theory and policy converge, but a tension remains. Frameworks describe competence as integrated, while curricula, timetables and assessment systems are often still organised around separate subjects and separate outcomes. Educators face the task of designing learning and assessment that match the integrated nature of competence.

Implications for Teaching, Assessment and Professional Development

Curriculum Design

The themes suggest that curricula should be built around integrated competences instead of separate lists of knowledge, skills and attitudes. For each competence, designers should state the knowledge it requires, the skills through which it is shown and the attitudes that sustain it, and then plan learning activities that develop all three at once. Uganda's competence-based curriculum is moving in this direction (NCDC, 2020) [16]. The evidence indicates, though, that its success will depend on preparing teachers to turn the framework into integrated classroom activities.

Teaching and Learning

Since knowledge underpins skill, teaching should not give up the systematic building of knowledge for the sake of skills. Since skill grows through practice and reflection, learners need repeated chances to apply what they know to realistic problems and to think about the results. And since attitudes act as gatekeepers, teachers should deliberately create conditions that support autonomy, competence and belonging (Ryan & Deci, 2020) [22], give learners early experiences of success and model the attitudes they hope to see. Project-based learning, case studies, simulations, internships and community service are especially good at developing the three together.

Assessment

Assessment is where integration is most often lost. Written examinations capture knowledge well and skill and attitude poorly. The themes point to assessment in which learners perform authentic tasks, which draws on observation, portfolios and projects, and which gathers structured evidence of attitudes such as responsibility, collaboration and integrity. This needs care, because assessing attitudes raises real questions of fairness and validity. Attitudes are better judged through behaviour observed over time and through reflective self-assessment than through a single test.

Professional Development of Teachers and Staff

The Ugandan evidence shows that teachers' own knowledge, skills and attitudes decide whether reforms take hold (Namubiru *et al*., 2024; Barasa *et al*., 2025) [3, 15]. Professional development should address all three. It should deepen teachers' grasp of the new curriculum, give them supported practice in new methods and engage honestly with their attitudes, including legitimate worries about workload and resources. Social cognitive theory suggests that the surest way to change attitudes is through successful experience, for example through coaching, peer observation and communities of practice.

Discussion and Recommendations

Discussion: Rethinking the Knowledge, Skills and Attitudes Relationship

Three broad conclusions follow from the analysis.

First, the relationship is not additive. Competence is more than a quantity of knowledge plus a number of skills plus a set of desirable attitudes. It appears when the three are brought together in doing a real task. Knowledge without skill stays inert. Skill without knowledge is shallow and easily misapplied. Both are wasted without the attitudes that lead people to use them. This is consistent with the definitions used in recent competence frameworks (Vuorikari *et al*., 2022; Redman & Wiek, 2021) [21, 29].

Second, the relationship is not linear. The familiar sequence in which knowledge shapes attitude and attitude shapes practice is too simple. The Ugandan health worker data reported by Olum *et al.* (2020) [20], where knowledge and practice were high but attitude was low, and the growth mindset debate (Macnamara & Burgoyne, 2023; Burnette *et al*., 2023) [7, 12] both show that the elements can move independently and affect one another in several directions.

Social cognitive theory gives the most convincing account of these dynamics: success builds confidence, and confidence drives further learning.

Third, the relationship is embedded in context. Resources, assessment systems, workload, culture and social norms affect whether knowledge and skill are gained and used, and they shape attitudes directly. The uneven implementation of Uganda's competence-based curriculum shows that one policy can produce very different results depending on conditions in schools (Barasa *et al*., 2025) [3]. To explain the gap between knowledge and practice only in terms of individual shortcomings is therefore both inaccurate and unfair.

Together, these conclusions call for a move away from a model of three separate boxes towards one of an interacting system set in context. That move has practical consequences for how education and training are planned, delivered and evaluated.

Recommendations

For Policy Makers and Curriculum Authorities

- Specify each competence in national curricula in terms of the knowledge, skills and attitudes it requires, and provide teachers with examples of integrated learning activities and assessment tasks.
- Align national examinations and assessment systems with the competence-based curriculum, so that skills and attitudes are assessed alongside knowledge and the incentives facing schools support integration.
- Direct additional resources, training and materials to schools serving poorer communities, so that the competence-based reform narrows rather than widens inequality.
- Commission longitudinal research on how learners' knowledge, skills and attitudes develop under the new curriculum, to provide an evidence base for continuous improvement.

For Leaders of Schools, Colleges and Universities

- Design professional development programmes that address teachers' knowledge, skills and attitudes together, using coaching, peer observation and communities of practice to build confidence through successful experience.
- Strengthen partnerships with industry and communities to provide internships, field attachments and project-based learning in which students apply knowledge in real settings.
- Develop institutional assessment policies that include authentic tasks, portfolios and structured observation, with fair and transparent approaches to the assessment of attitudes.
- Create learning environments that support autonomy, competence and belonging for both staff and students, recognising that institutional culture shapes attitudes.

For Teachers and Lecturers

- Build a strong foundation of knowledge while giving learners frequent opportunities to apply it to meaningful problems and to reflect on the results.
- Plan early, well-supported experiences of success, especially for struggling learners, to start positive cycles of confidence and effort.
- Model the attitudes you hope learners will adopt, including curiosity, integrity, respect and a willingness to learn from mistakes.
- Use feedback that focuses on effort, strategy and improvement, and invite learners to reflect on how their knowledge, skills and attitudes are changing.

For Learners and Professionals

- Treat learning as the development of competence rather than the accumulation of content, and seek opportunities to apply what you know through projects, internships and community work.
- Reflect regularly on your own attitudes towards learning and work, and recognise that confidence grows through practice and persistence.
- Take responsibility for lifelong learning, since the knowledge and skills required at work will continue to change.

Conclusion

This article set out to examine the relationship between knowledge, skills and attitudes. Drawing on social cognitive theory, the theory of planned behaviour and experiential learning theory, and using a reflexive thematic analysis of literature published between 2020 and 2026, it developed six themes. Knowledge is the foundation of skilled action. Skills are knowledge made operational through practice, feedback and reflection. Attitudes act as a gatekeeper, deciding whether knowledge and skills are acquired and used. The three interact in both directions and in cycles, so that success builds confidence and confidence drives further learning. Context moderates the relationship through resources, assessment, culture and social norms. Finally, current competence frameworks increasingly treat the three as integrated parts of one capability.

Our central conclusion is that knowledge, skills and attitudes form an interacting system, not three separate stores, and that competence emerges only when they come together in real performance in a supportive setting. For Uganda, where the competence-based curriculum is a major national investment in human capital, the message is clear. The reform will succeed only if curricula, teaching, assessment and teacher development are designed around integrating knowledge, skills and attitudes, and only if schools, especially those serving disadvantaged communities, receive the resources that make such integration possible. The same holds for universities preparing graduates for a labour market in which the required mix of knowledge, skills and attitudes is changing quickly.

The conceptual model developed here now needs empirical testing. Longitudinal mixed-methods studies could follow how learners' knowledge, skills and attitudes develop and interact over time under the competence-based curriculum. Research in Ugandan universities and workplaces could examine how attitudes mediate the use of knowledge and skill in professional practice. Comparative work across East Africa would help identify the conditions under which integration works best, and would strengthen the African contribution to a debate so far dominated by evidence from other regions.

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How to Cite This Article
Richard O, Mokaya NJ, Collins B, Specioza A. The relationship between knowledge, skills, and attitudes: a thematic review of competence development in education and practice. Int J Multidiscip Res Growth Eval. 2026;7(6):216-224.

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