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# Formal, non-formal, and informal learning: *What are they, and how can we research them?*

Research Report

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# Contents

# Executive summary

This review uses research literature to outline the characteristics, benefits and disadvantages of formal, non-formal, and informal learning. There appears to be a consensus around the meanings of formal and informal learning. Formal learning broadly aligns with organised, institutionalised learning models (such as learning seen in schools), whilst informal learning describes the everyday learning that people experience throughout their lives, and which can go easily unrecognised. Non-formal learning is less clearly understood. Despite its specific use in various cross-national policy contexts (e.g., Council of Europe, 2022; OECD, n.d.), it is most easily understood in its negative sense, i.e., as being 'not formal', so it is pertinent to explore its meaning. We use this review specifically to build a better understanding of non-formal learning and to consider the methodological implications for researching this type of learning.

Formal learning is relatively well-defined in the research literature, which makes it the easiest to research. It fits well into narrow curriculum models (i.e., models that focus specifically on organised learning). This presents challenges to those who want to better understand how non-formal and informal learning mechanisms work in schools.

Non-formal and informal learning are complex but powerful concepts, and they create a tension for curriculum thinking. Non-formal and informal learning fit less well into narrow curriculum models and require us to use a broad conceptualisation of curricula (i.e., one that considers curricula to include all of the experiences of learners across their period of education). Non-formal learning is a hybrid of the other forms of learning, meaning that it is in the interaction of formal and informal elements that non-formality attains its special character. These characteristics include:

| Formal learning | Non-formal learning | Informal learning |
|---|---|---|
| Learning is structured (e.g., linear objectives) | Learning **may be** structured | Learning is not structured |
| Learning is promoted through direct teaching behaviours | Learning is promoted through indirect teaching behaviours | |
| Learning is intended (by educator and learner) | Learning is intended by the **learner** | Learning may not be intended by the learner |
| Learning is recognised by the learner and educator | Learning is recognised by the **learner** | Learning may not be recognised by the learner |
| Motivation for learning may be extrinsic to the learner | | Motivation for learning is intrinsic to the learner |
| Learning takes place in educational institutions | Learning **can** take place in educational institutions | Learning can take place anywhere |
| Learning has a mandated dimension | Learning has a voluntary dimension | |
| Learning may be recognised or measured through qualifications | | Learning is not recognised or measured through qualifications |
| Learning may primarily focus on propositional knowledge | Learning may focus on both propositional and procedural knowledge[1] | |
| Learning tends to have a cognitive emphasis | Learning involves cognitive, emotional, social and behavioural elements | |

[1] Propositional knowledge includes conceptual knowledge (e.g., 'knowledge-that') and contrasts with procedural knowledge which includes competencies, techniques and skills (e.g., 'knowledge-how') (Rata, 2019).

| Formal learning | Non-formal learning | Informal learning |
|---|---|---|
| Curriculum is written down | Curriculum **may be** written down | Curriculum is not written down |
| Learning process is 'top down', focusing on developing specific knowledge and skills | Learning process is 'bottom up', focusing on the learner and their needs | |
| Learning follows formal curriculum | Learning may complement formal curricula | |
| Learning may not be linked to socialisation[2] | | Learning is often linked to socialisation |

While formal and informal learning are covered more comprehensively in the research literature, our comprehensive review failed to find any research that outlined a comprehensive methodology for identifying non-formal learning. This leaves us room to consider the most appropriate methods for its research.

The hybrid nature of non-formal learning means that researchers need to consider using a diverse range of qualitative and quantitative methods to study it (e.g., document-based analysis that captures intended learning aims alongside interactional observations of the enacted learning process).

[2] In this context, when referring to 'socialisation', we mean how learners might conform to the (often unwritten) norms and rules of educational settings such as schools.

# Introduction

Interest in the demarcation between 'formal, non-formal, and informal learning' started in the 1960s (Norqvist & Leffler, 2017). At the time there was a perception that educational systems were not transforming themselves in order to meet changing conditions in society, so there was consideration around how learning needs might be met through differing learning arrangements. This debate has contemporary relevance since schools in the UK are enjoying increased levels of curricular autonomy and are exploring less formalised learning arrangements (e.g., project-based learning or elements of the International Baccalaureate (IB), such as the *Theory of Knowledge* component).

From a research perspective, understanding non-formality in learning could contribute to our collective thinking around effective curriculum design and the structuring of learning in schools (e.g., where learning is best located, what form it might take, and how it is organised). As Figure 1 shows below, education, curriculum, and learning have considerable areas of overlap, but learning can also occur on the fringes of, or outside of formal curriculum arrangements. It is this non-formal space (the sphere that falls outside of the curriculum sphere) that motivates our review.

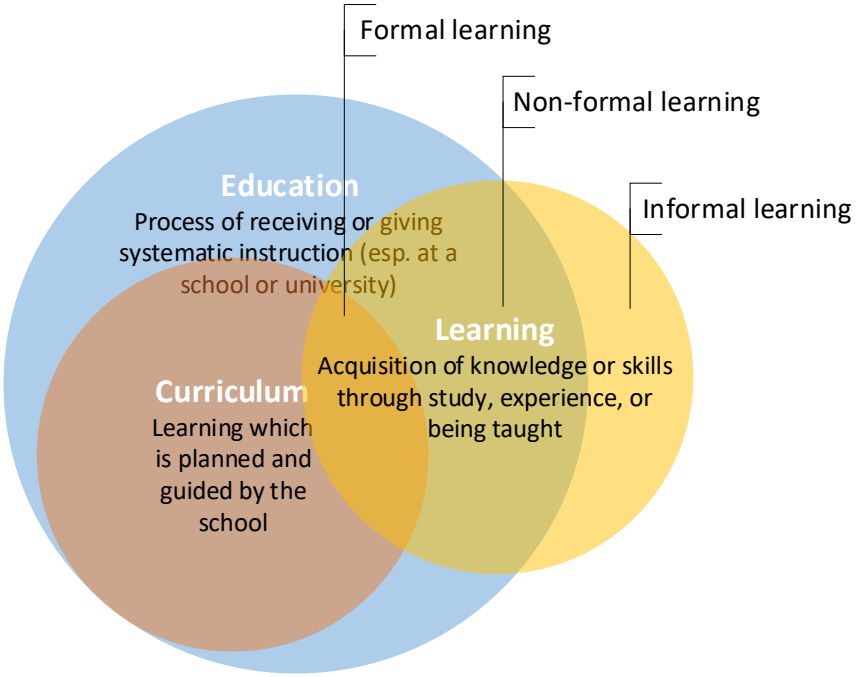


**Figure 1: Definitions of Education, Learning, and Curriculum[3]**

Although 'less formal learning' is relatively under-represented in the research literature (Casey, 2017; Eshach, 2007), studies considering educational formality are relatively ubiquitous, straddling learning phases (e.g., early years to adulthood), learning contexts (e.g., academic and practical), learning models (e.g., didactic and experiential), and learning environments (e.g., schools, museums, workplaces, etc.). This ubiquity also has a drawback

[3] Education and Learning definitions taken from *Cambridge Dictionary* (Cambridge University Press, 2022), Curriculum definition from Kerr JF (ed.) (1968) Changing the Curriculum. London: University of London Press.

as the language and concepts of formal, informal, and non-formal learning tend to be used in ways that are contradictory and contested (Colley et al., 2003). A comprehensive literature review could help to inform a common understanding of non-formal learning so that others may find it easier to see it and understand it in the future. We also hope that this review might have implications for further empirical research. Our review outcomes could be used to inform the development of research tools to explore whether under-recognised non-formal learning occurs in formal learning contexts (e.g., classrooms).

To further our understanding of non-formality and how this relates to organised learning (through the curriculum), our review sets out to define the characteristics, benefits, and disadvantages of the different modes of learning (formal, non-formal, and informal). In addition, the review outcomes lead us to question the perhaps overly narrow definition of curriculum that appears in the diagram (and in some educational debates). The review outcomes suggest the need for a more expansive definition that can encompass more learning experience, which raises questions about the most appropriate contexts for learning and how to acknowledge and plan for this.

# Method

Our literature review process had three steps: literature source identification, search criteria definition, and document coding.

### Literature sources

We chose six databases to locate our research evidence base[4]. We chose these databases because they have a broad coverage of published, peer-reviewed research literature.

### Search criteria

To explore the databases, we chose a variety of search terms that would elicit documents relating to non-formality in education. We anticipated that documents dealing with non-formality would also discuss formality, therefore not requiring a separate search for these documents.

We searched for non-formality[5] across all document fields and stipulated that these needed to be used in conjunction with either *curriculum*, *learning*, or *education*. For manageability purposes we stipulated that we wanted documents published in the past 20 years (although we ignored this if a paper appeared to be particularly important). We also refined the search by focusing specifically on documents that fell within the educational science and research field. This meant that we ignored papers that related to social media and technology or that focused specifically on further and/or higher education, work-based learning, lifelong learning, or teacher professional development. Our search identified 134 documents that matched our criteria for inclusion in the review process.

### Coding

Discussion of the different modes of learning (formal, non-formal, and informal) often overlaps, as does discussion of learning and curriculum. The nested nature of these

[4] Web of Science Core Collection; University of Cambridge Library iDiscover; Taylor & Francis journal database; Scopus/Elsevier database; Wiley Online Library; ERIC.ed

[5] To identify non-formality, we used a series of terms that are commonly associated with this area of curriculum enquiry (e.g., see Endeley and Zama, 2021). These terms were: *Non-formal, Informal, Non-taught, Unstudied, Hidden, Implicit, Invisible, Unwritten,* or *Covert*.

concepts meant that we needed to develop a coding framework that could separate out and capture definitions for these concepts, and then link them to specific benefits and disadvantages. We also needed space in our coding framework to capture references to curriculum and learning types that did not fall into any of the formal, non-formal, or informal categories but that related to them in some way (e.g., discussion around the hidden curriculum).

Our coding frame included 21 low inference codes[6] covering curriculum and learning definitions, benefits, and disadvantages for the three modes of formality (see Figure 2). For the coding process we split the documents alphabetically, with one researcher reading, analysing, and coding documents from authors with surnames in the range A-K and the other doing so for authors in the range L-Z. We used MAXQDA 2022 software (VERBI Software, 2021) for this coding process, which allowed us to code separately and then to combine our analyses.

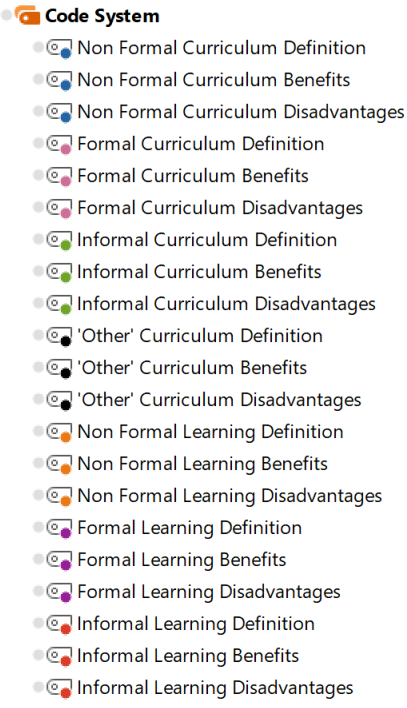


**Figure 2: MAXQDA 2022 coding framework**

Another facility of the coding software was that it allowed us to capture comments or memos of issues of interest that we encountered during our reading of the research. One researcher reviewed all of these and, following discussion with the other researcher, incorporated the messages into the emerging narrative.

We distributed the responsibilities for bringing together the narrative from the different code areas. One researcher reviewed the ‘Other Curriculum’ codes and considered how these linked with the issues of formality. This researcher also developed the narrative from the codes relating to learning (formal, non-formal, and informal), whilst the other researcher developed the narrative around the curriculum codes (formal, non-formal, and informal).

[6] Codes that classify specific, denotable, relatively objective features (Chávez, 1984, p. 237)

Once these narratives were complete, they were combined by one researcher. Then the researchers met to consider the coherence of the narrative and to validate the messages contained in the overall analysis.

# What is formal learning?

Coombs and Ahmed provide a much-cited definition of formal education as being "the institutionalized, chronologically graded and hierarchically structured… system, spanning lower primary school and the upper reaches of the university" (Coombs & Ahmed, 1974, p. 8). This definition implies that formal learning includes a number of elements. Formal learning involves learning institutions, which also implies a role for defined educators (e.g., teachers). Some argue that this means that formal learning is largely teacher focused (Dovey & Fisher, 2014), relying on teacher-set activities (Radović & Passey, 2016), steered by sequentially structured learning goals (e.g., specified educational objectives or a syllabus (Council of Europe, 2022)), and organised into a chronologically graded system (Garner et al., 2015).

Learning in formal systems is generally hierarchic (i.e., based on learning objectives that are organised into linear progressions). Institutions and educators have timetabling responsibilities (Johansson, 2003) and employ direct teaching behaviours (e.g., actions explicitly intended to instruct knowledge and skills and to manage a classroom, such as demonstrating, explaining, giving feedback, making corrections, and setting goals (Jung & Choi, 2016)). Formal systems also tend to stipulate minimum requirements for mandated learner participation (e.g., years of attendance or guided learning hours) (Moldovan & Bocoş-Binţinţan, 2015).

Learning in formal systems is intentional on the part of educators and learners (Cain & Chapman, 2014; Yeasmin et al., 2020). Formal learning often results in certification and recognition in ratified diplomas or qualifications (Ivanova, 2016; Pienimäki et al., 2021). The motivation for formal learning tends to link with the pursuit of external rewards (e.g., assessment grades) more than for other less formal learning types (Pienimäki et al., 2021). Measured learning can also form part of the evaluation function, since such a function is normally required for formal systems (Alnajjar, 2021).

Formal learning tends to focus heavily on propositional rather than procedural knowledge forms[7] (Colley et al., 2003), and this knowledge relies on established content (Evans et al., 2015) that is generalisable beyond a specific context (Powdyel, 2016). Some argue that formal learning has more emphasis on cognitive achievement, i.e., successes attributable to cognitive abilities, than other less formal types of learning (Romi & Schmida, 2009).

[7] Propositional knowledge includes conceptual knowledge (e.g., 'knowledge-that') and contrasts with procedural knowledge which includes competencies, techniques and skills (e.g., 'knowledge-how') (Rata, 2019).

**Table 1: Formal learning (summary)**

| Formal learning |
| --- |
| • Learning has clearly defined features and structures *(e.g., learning objectives set out in linear progressions)*<br>• Learning is promoted through direct teaching behaviours and visible outcomes<br>• Learning is intended and planned (by educator and learner)<br>• Learning is recognised (by educator and learner)<br>• Motivation for learning may be extrinsic to the learner (e.g., assessment grades)<br>• Learning takes place in formal educational institutions<br>• Attendance at a place of learning might be compulsory<br>• Learning may be recognised and measured through qualifications<br>• Learning may focus heavily on propositional knowledge<br>• Learning tends to have a cognitive emphasis<br>• Curriculum is written down alongside policy documents<br>• Learning is focused on developing specific knowledge and skills<br>• Learning follows a formal curriculum<br>• Learning may not be linked to socialisation[8] |

## Formal learning and the curriculum

Leask's (2009) definition of formal curricula includes a number of key elements that are commonly associated with the concept:

> When referring to the formal curriculum … I am referring to the sequenced programme of teaching and learning activities and experiences organised around defined content areas, topics, and resources, the objectives of which are assessed in various ways including examinations and various types of assignments, laboratory sessions, and other practical activities (Leask, 2009, p. 207).

One key element of a formal curriculum is that it is organised and governed by a well-defined set of rules or features (Alnajjar, 2021; Melnic & Botez, 2014). Formal curricula are often a written programme (also known as the written, explicit or official curriculum, e.g., see Bamkin, 2020; Casey, 2017; Giroux and Penna, 1979). The written programme can (and often will) include a number of aspects, such as aims, objectives/standards, lesson plans, equipment to be used, content, order of teaching for specific topics, an evaluation process, teaching strategies, textbooks, and assessments. Wilkinson (2014) also augments this list with published syllabuses and associated policy documents. The curriculum will also tend to be enacted in official learning institutions (Alnajjar, 2021; Aycicek, 2021; Bray et al., 2018; Inlay, 2003; Johansson, 2003).

Formal curricula will also tend to organise content sequentially. For example, Johansson (2003) states that “learning in school should be progressive, meaning that there is a plan, and a conscious strategy from the teacher meaning that the child should be able to increase their knowledge from a lower level to a higher one” (Johansson, 2003, p. 112). This indicates that the formal curriculum follows a conscious strategy to develop learners’ knowledge to a higher level.

[8] In this context, when referring to ‘socialisation’, we mean how learners might conform to the (often unwritten) norms and rules of educational settings such as schools.

In summary, the reviewed literature suggests that formal learning is organised through the curriculum within the broader field of education (see Figure 3 below).

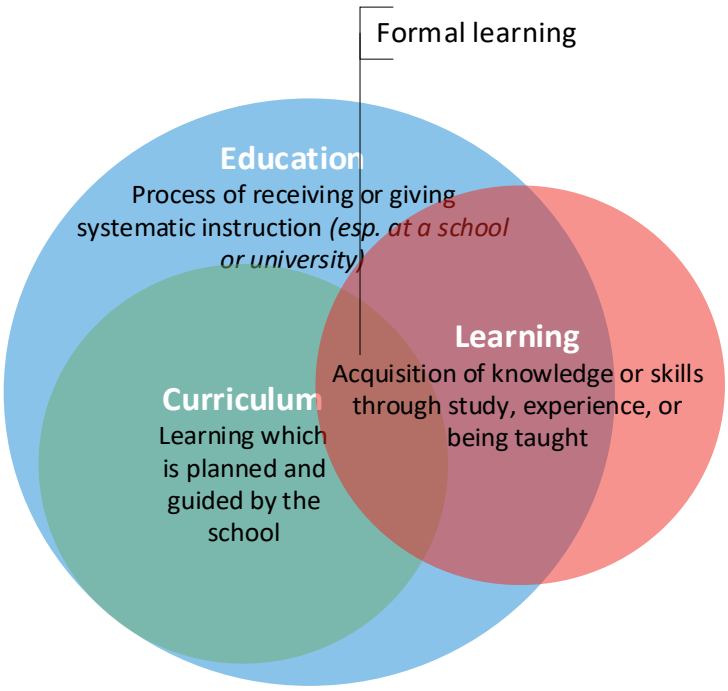


**Figure 3: Where formal learning is situated with regard to Education and Curriculum**

## Benefits of formality in education

Since formal learning is generally specified (Läänemets et al., 2018), it can be used by those responsible for organising education (e.g., state or regional agencies) to standardise learning practices across different locations in a system. This means that formal learning can help to refine, regulate, and control education in the interests of efficiency (Cain & Chapman, 2014). This also means that formal curricula can be used to raise the status of certain skills and knowledge that are considered to be important to society. For example, the curriculum can be harnessed to ensure that certain things are taught in schools, such as social and personal values (Aycicek, 2021).

The specified nature of formal learning also supports the accumulation of shared knowledge (beyond specific contexts), which can enhance social mobility (Morgan, 2015; Young & Muller, 2013). Accrued, recorded, propositional knowledge allows each generation to know more and better than their predecessors (Colley et al., 2003). Such knowledge, fostered through disciplinary communities has generalisable qualities, making it applicable in a wide range of contexts and circumstances. Access to this high-status knowledge (based on ability rather than social contacts or status) has the potential to empower learners from disadvantaged or marginal groups (Bernstein, 1971, cited in Colley et al., 2003). A formal curriculum, when mandated at a national level, should expose most learners to common ideas and knowledge and undermine any inequality of access between different groups in the national population.

In comparison with other learning types, formal learning has well established evaluation and assessment methodologies available. It has been observed that testing and assessment

within formal education and training has a long history of practice, research and theory to draw upon (Bjørnåvold, 2000).

## Disadvantages of formality in education

One of the most significant limitations of the formal concept of education and learning is that it lacks the ability to truly describe 'what is going on'. The formal curriculum does not show everything that teachers do, teach, or create in classrooms, or what the experiences of learners are in those classrooms. For example, Bamkin (2020) states that "whilst [the written curriculum] … considers the teachers' perspectives and planning for core areas of moral education, it overlooks the minutiae of everyday teaching practices and efforts made outside the curriculum "hot-spots"" (Bamkin, 2020, p. 236). One can therefore analyse formal, written curricula, but they will not represent how each teacher interprets and delivers them or what learners think and experience as they are exposed to them. Considering that every school and teacher is different, the formal curriculum may not tell us much about how the curriculum is enacted in classrooms.

Not all learners engage positively with formal learning; there are significant drop out rates in some international formal teaching programmes (Powdyel, 2016). Some learners learn better in informal environments (Affeldt et al., 2018), with formal curricula being sometimes seen as one-way and rigid (Melnic & Botez, 2014), and with some learners being resistant to teacher-led instruction (Gage et al., 2020).

Engaging with abstracted knowledge that is removed from learner experience may be demotivating for some learners. For example, it has been observed that teaching segments of decontextualized, unfamiliar music to learners can lead some to abandon instrument playing (Cain & Chapman, 2014). Kidman et al. (2013) also mention that formal curricula may not have the same outcomes for indigenous and non-indigenous learners. If a curriculum is written in a way that represents one group more than others, it may contain biases towards that group, which in turn could disadvantage or disengage other groups.

It is acknowledged that intuitive concepts are difficult to dislodge, being linked with learners' past experiences, and resistant to change. Although formal learning has an important role in shifting learners' incorrect intuitive concepts (e.g., 'flat earth' concepts), some studies have shown that formal learning approaches alone are not sufficient to change younger learners' misconceptions or to overcome naive scientific ideas (Frappart & Frède, 2016; Nussbaum & Novak, 1976). Intuitive concepts are difficult to dislodge as a teacher needs to undermine a learner's prior learning. Therefore, it is likely that the abstractness of some formal learning may need to be complemented by experience-based learning activities (e.g., visits to museums and planetariums).

It has also been suggested that formal learning approaches can restrict teachers' pedagogic freedom, which can have an impact on learning. Brickhouse (1989) makes references to some of the negative, stifling effects of the mandated curricula and assessments, and formal educators may be constrained by issues such as available classroom time or pressures relating to high-stakes testing arrangements which hinder their abilities to engage or motivate their learners (McKay et al., 2013).

# What is non-formal learning?

Coombs and Ahmed provide a much-cited definition of non-formal education. It is “any organized, systematic, educational activity carried on outside the framework of the formal system to provide selected types of learning to particular subgroups in the population, adults as well as children” (Coombs & Ahmed, 1974, p. 8). Like many definitions of non-formal education, it appears that it is “a 'negative' concept in the sense that it is a negation of something else. It gives little positive indication of content, profile or quality” (Bjørnåvold, 2000, p. 22).

Coombs and Ahmed’s definition implies that non-formal learning includes several elements. It is systematically planned (to an extent) (Allaste et al., 2021; Mok, 2011) and structured around learning objectives (Garner et al., 2015). It takes place outside of compulsory educational provision (Filippoupoliti & Koliopoulos, 2014), but can take place anywhere (e.g., in school buildings) (Mok, 2011).

The evidence we examined implies that non-formal learning can be promoted through Indirect Teaching Behaviours (ITBs), which are also known as non-direct teaching behaviours. ITBs include teachers’ facial expressions, tone of voice, gestures, and so on. Jung and Choi (2016) note that ITBs are valuable to research investigating the effects of teachers’ behaviours on students’ social and moral development.

Jung and Choi (2016) found that ITBs were important in promoting a positive learning environment, encouraging the development of effective student relationships with peers, and motivating students. Part of this positive learning environment was influenced by teacher encouragement and caring behaviours, which had an important impact on student engagement. This is important as non-formal learning is often self-directed, involves a degree of student choice in engagement, and relies on some element of intrinsic motivation. The role of ITBs therefore appear to be very important to consider since they can have an influence on student motivation and participation in non-formal learning.

Non-formal education is aimed at specific groups of learners, and observers note that this has two aims. One is to educate those not currently served by formal education (compensating for the limitations of the formal system), and another is to encourage social inclusion through targeting specifically marginalised learners (Gee, 2015; Hidayat et al., 2016).

The Coombs and Ahmed definition has subsequently been augmented. Some commentators highlight how non-formal learning has a greater focus on learners’ needs and interests than formal learning, and this implies a number of things. Non-formal learning involves learner choice in learning components (e.g., flexible modular arrangements or choice of content within learning programmes), a greater freedom for learners to join or leave an activity (voluntarism), and use of assessment to principally inform learning (Alnajjar, 2021; Gage et al., 2020; Kiilakoski & Kivijärvi, 2015; Madjar & Cohen-Malayev, 2013).

Non-formal learning is intentional from the learner’s perspective (Radović & Passey, 2016; Straka, 2004) and the motivation for learning may be intrinsic to the learner (Eshach, 2007). This is because non-formal learning represents a shift from institutionalised control over knowledge (e.g., craft guilds, schools, etc.) towards individualised control and self-directed learning (Colley et al., 2003; Ionescu, 2020). It is also noteworthy that non-formal learning is

generally less credential-based than formal learning, so relies less on formal qualifications (Colley et al., 2003; Ivanova, 2016).

Non-formal learning is associated with a broader range of learning activities than formal learning, and this means that it tends to have less focus on cognitive performance (Madjar & Cohen-Malayev, 2013) and a more balanced emphasis on intellectual, emotional, social, and behavioural concerns (Młynarczuk-Sokołowska, 2022). This shift in emphasis links with how non-formal learning is frequently directed to acquiring practical knowledge, skills or competencies in a concrete context, and therefore is less often focused on theoretical learning (Souto-Otero, 2021). These observations suggest that non-formal learning has a greater focus on procedural knowledge than on propositional knowledge forms, which has an implication for learning processes. As Sadler (1989) notes, 'few physical, intellectual or social skills can be acquired satisfactorily simply through being told about them. Most require practice in a supportive environment which incorporates feedback loops' (Sadler, 1989, p. 120).

Learning transmission relies less on direct teaching behaviours and tends towards experience-based learning (Norqvist & Leffler, 2017). This means that non-formal learning has social and behavioural dimensions. Educators are more likely to use mentoring approaches to share their expertise, and learners are more likely to use observation and copying strategies (Mok, 2011). It is also more common for non-formal learning to occur through participation in group activities where there are symmetric interactions between participants (Madjar & Cohen-Malayev, 2013; Zupančič, 2018).

Examples of non-formal learning from the research literature include adult literacy programmes (Afrik, 1995), non-formal schools for working children (Sud, 2010), learning in Youth Centres (Rannala & Dibou, 2020), music learning in community groups (Mok, 2011), and out of school activities that may be linked to the formal curriculum, such as visits to museums, universities, after school sports clubs etc. (Filippoupoliti & Koliopoulos, 2014; Garner et al., 2015; Gloria et al., 2014; Ionescu, 2020).

**Table 2: Non-formal learning (summary)**

| Non-formal learning |
| --- |
| • Learning can have a structure (e.g., linear objectives) but doesn't always have one<br>• Learning is promoted through indirect teaching behaviours<br>• Learning is recognised by the learner<br>• Motivation for learning may be intrinsic to the learner and learning is intended by the learner<br>• Learning often has a voluntary element<br>• Learning can take place in educational institutions<br>• Learning may not be recognised through qualifications<br>• Learning may not heavily focus on propositional knowledge<br>• Learning involves cognitive, emotional, social, and behavioural elements<br>• Curriculum may not be written down<br>• Learning is focused on the learner and their needs<br>• Learning may complement formal learning/curricula<br>• Learning may not be linked to socialisation |

## Non-formal learning and the curriculum

The curricular implications of non-formality relate to the structured aspects of learning. Mok (2011) states that "non-formal learning refers to a kind of learning which is relatively

systematic and (but not necessarily) pre-planned, with a clear intention on the part of the learner and teacher to accomplish a particular learning task" (Mok, 2011, p. 15). Although this quote refers to learning, the reference to systematic, pre-planned accomplishment aligns it closely with more formal definitions of curricula. The literature on non-formal curriculum suggests that the boundaries between curriculum and learning may not be clear cut, with less formal learning arrangements and their inherent flexibility being able to complement formal curriculum aims. Moldovan and Bocoş-Binţinţan (2015) highlight how non-formal education has an optional character, but that it may complement the objectives and contents of schooled learning (Moldovan & Bocoş-Binţinţan, 2015, p. 338). Interestingly, it appears that non-formal curriculum learning that happens outside of formal learning institutions can work alongside the formal curriculum and can possess some characteristics of formal systems, such as following institutionalised frameworks.

In summary, the reviewed literature suggests that non-formal learning can have a relationship with the schooled curriculum, but that it is located more broadly in the educational rather than the school sphere of control (signified by the way that the non-formal learning connector touches upon the curriculum but resides in the education/learning space in Figure 4 below).

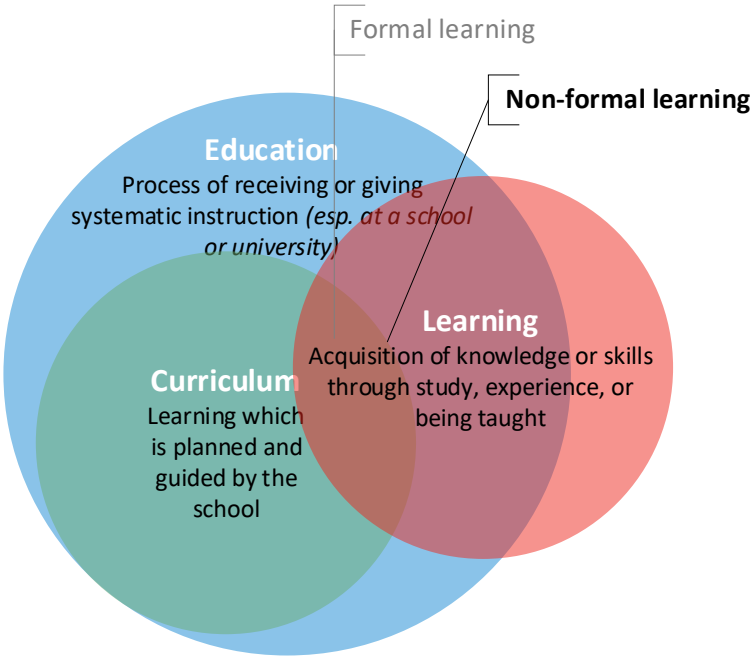


**Figure 4: Where non-formal learning is situated with regard to Education and Curriculum**

## Benefits of non-formality in education

Learning in 'authentic' contexts (e.g., involving real-world problems embedded in contexts relevant to the learner) can be motivating and engaging for learners (Affeldt et al., 2018; Ben Zvi Assaraf, 2011). The context for knowledge application can affect learning in a number of ways. Situational motivation fosters intrinsic motivation (Garner et al., 2015) with the context making abstract ideas "more real, tangible and concrete" (Badger, 2021, p. 6), and giving the knowledge value as it is seen to connect with experience (A. N. Lee, 2012). Non-formal learners can apply skills to contexts they enjoy (e.g., reading for pleasure, e.g., Council of Europe, 2022), new contexts may affect their attention to learning detail (e.g., linking to variation theory and the issue of 'seeing the same thing in different contexts' to recognise its

specific features, e.g., Eshach, 2007), and learners may be more able to fulfil aims that are important them (Norqvist & Leffler, 2017).

Non-formality has a reflexive potential, which has implications for pedagogy and the pacing of learning. The literature suggests that one advantage of the non-formal curriculum is that it has a more flexible structure than more formal curricula. For instance, Ionescu (2020) suggests that "non-formal activities respond to the challenges of today's society, by leaving the rather rigid framework of the school organization" (Ionescu, 2020, p. 2). As Melnic and Botez (2014) note, non-formal curricula may be "capable of adapting to the needs and interests of students, for which time is not a pre-established factor, but is contingent upon the student's work pace, [and] certainly do not correspond to those comprised by formal education" (Melnic & Botez, 2014, p. 2). A benefit of this flexibility is that it can allow learners who work at a slower pace to not feel rushed or unable to keep up with the pace of more rigid, time-pressured curriculum delivery.

Non-formal learning (such as field trips) can have a holistic impact on learners, cultivating affective, cognitive, and social domains (Badger, 2021). At an affective level, learner interest can be heightened through non-formal learning contexts (Garner et al., 2015), and this can have a positive impact on future career aspirations (Lin & Schunn, 2016). At a cognitive level, learning in non-formal contexts can have a long-lasting impact on memory (Frappart & Frède, 2016). This impact might be due to how learners access multiple perspectives through focused discourse, and link this to their prior understandings (Eshach, 2007). There is evidence that field trips impact on critical thinking skills through encouraging interdisciplinary, cross-curricular knowledge linkages. Reflecting on teachers' perceptions of students' learning gains, Badger (2021) explains this further:

> School trips provide an opportunity for students to become active learners when they regulate their own learning through reflection, evaluation, and asking questions … that may foster their tolerance and critical thinking skills of analysis, comparison, description, evaluation, and problem solving (Badger, 2021, p. 9).

At a social level, it appears that the changed rules of learning that link with non-formal contexts create a 'loose space' (Kiilakoski & Kivijärvi, 2015) that encourages new ways of working with others (e.g., active participation and collaboration) (Frappart & Frède, 2016). This participation supports the development of a variety of skills and dispositions, including communication skills, organisational skills, leadership skills, social skills, time management skills, intercultural skills, persistence, and resilience (Läänemets et al., 2018; Souto-Otero, 2016). Simac et al. list multiple studies to claim that there is strong evidence that some of these skills impact on learner self-worth and confidence, and these are fundamental to learner wellbeing (Simac et al., 2021). The 'loose space' of non-formal learning contexts can also create opportunities for teachers to change the learning conditions, e.g., through developing innovative tasks or using different materials (Affeldt et al., 2018).

## Disadvantages of non-formality in education

Variability in practices, contexts, or educator abilities are concerns in non-formal learning. Non-formal learning programmes that lack links to a rigid curriculum structure can lead to varying practices and suboptimal outcomes. For example, there are historic concerns that "as a result of the lack of curriculum in many non-formal education programmes in sub-Saharan African countries, the outcomes in many [learning] programmes are inadequate" (Afrik, 1995, p. 36). Context is also very important to non-formal learning, and so context

variability is a concern. Some contexts lack resources and limit the opportunity for learner development (Colley et al., 2003). Educator variability is another concern for non-formal learning. Some negative relationships have been found between attending after-school science programmes and science achievement (Lin & Schunn, 2016), and it is possible that those responsible for leading learning activities may not have the ability to link the concepts encountered to learners' prior experiences or to a formal curriculum (Badger, 2021).

The nature of the knowledge and skills encountered in non-formal learning can create problems. It is difficult to collect evidence that justifies achievement in non-formal learning constructs that have tacit characteristics (Bjørnåvold, 2000). Non-formal learning is less likely to be formally assessed since assessment often needs to be observed in context. Bjørnåvold notes that assessment is challenging on a large scale, as well as being challenging when trying to avoid the assessment of "something other than what is intended" (Bjørnåvold, 2000, p. 189). This means that non-formal learning may be seen as lower status (Latchem, 2018). It also makes it difficult to monitor educational quality (Powdyel, 2016). This is problematic as high non-completion rates for some non-formal learning courses are a concern (Morris, 2019), and the lack of assessment and monitoring make it challenging to evaluate whether this is due to learning programme quality (Powdyel, 2016).

Another possible disadvantage of non-formality relates to how it can link to formal curricula. Where non-formal learning is harnessed to support the aims of structured learning programmes it can share some of the identified disadvantages of formal learning and curricula (for instance, its impact on learner disengagement). It is possible that learners who are already disengaged from the formal curriculum may not find the non-formal learning context to be any more engaging. This issue has already been discussed by Johnson and Oates (2016) who caution against the colonisation of non-formal learning spaces by educators who seek to engage learners in formal learning goals.

# What is informal learning?

Informal learning is often defined as a residual category of non-formal learning, which itself is a residual category of formal learning (Schugurensky, 2000, p. 2). This can be problematic as defining something by what it is not does not help to understand its qualities (Bourke et al., 2018, p. 772). Defining informal learning can also be problematic as some people used the terms *informal* and *non-formal* interchangeably (Colley et al., 2003).

Coombs and Ahmed provide a much-cited definition of informal learning as:

> the lifelong process by which every person acquires and accumulates knowledge, skills, attitudes and insights from daily experiences and exposure to the environment … Generally [it] is unorganized and often unsystematic; yet it accounts for the great bulk of any person's total lifetime learning-including that of even a highly 'schooled' person (Coombs & Ahmed, 1974, p. 3).

This definition implies that informal learning includes a number of elements. It can be a by-product of other experiences (Allaste et al., 2021; Cain & Chapman, 2014). It includes tacit knowledge that is not specifically sought, and can remain unnoticed by the learner, e.g., "informal learning is largely invisible, because much of it is either taken for granted or not recognised as learning; thus, respondents lack awareness of their own learning" (Eraut, 2004, p. 249). It is also possible for learners to become conscious of unanticipated informal learning, and this is called incidental learning (Schugurensky, 2000, p. 3).

Coombs and Ahmed's definition implies that informal learning does not rely on didactic approaches, and that it can be facilitated by influential 'more expert others' and peers (Bourke et al., 2018; Eshach, 2007; Johansson, 2003). In many cases, learners have a significant level of influence on the process. Learning is embedded in meaningful activity (to the learner), is likely to be initiated by the learner, and motivated by a perceived need (Bourke et al., 2018; Kral & Heath, 2013). Informal learning is voluntaristic (Garner et al., 2015) and not explicitly structured by others (e.g., parents, teachers, institutions, etc.) (Alnajjar, 2021; Eisner, 1992).

Informal learning is also heavily situation dependent. Although it occurs everywhere (Gloria et al., 2014), it is highly contextualised and shaped by the environment in which it occurs (Eisner, 1992; Filippoupoliti & Koliopoulos, 2014). Sharing some commonalities with situated learning (Lave & Wenger, 1991), the important point here is that learning is shaped directly by features of the learning environment and where tasks 'make sense' in relation to that context (e.g., self-directed learning, (Morris, 2019).

Although some of its characteristics overlap with other learning types, informal learning differs from them as it defies systematic organisation (Norqvist & Leffler, 2017). This lack of organisation means that learning can appear haphazard (i.e., not sequentially structured, e.g., Pienimäki et al., 2021), and cannot be certificated (Alnajjar, 2021; Bourke et al., 2018).

Informal learning is less language-based than formal learning. Whereas school learning can rely on language used out of the context of practical activities and concrete referents (Scribner & Cole, 1973), informal learning may involve non-verbal modes of behaviour (i.e., learning through doing). These non-verbal modes include imitation, copying or mirroring of expert skills and knowledge, modelling, private trial and error, and community member critique (Cain & Chapman, 2014; Evans et al., 2015; Gower, 2012; Johansson, 2003; Kral & Heath, 2013).

**Table 3: Informal learning (summary)**

| Informal learning |
| --- |
| • Learning is not structured (e.g., does not have linear objectives)<br>• Learning is promoted through non-direct teaching behaviours<br>• Learning may not be intended or recognised by the learner<br>• Motivation for learning is intrinsic to the learner<br>• Learning can take place anywhere<br>• Learning may complement formal curricula<br>• Learning has a voluntary dimension<br>• Learning is not recognised through qualifications<br>• Learning may not heavily focus on propositional knowledge<br>• Learning has a cognitive, emotional, social, and behavioural emphasis<br>• Curriculum is not written down<br>• Learning is often situation-dependent and a result of other activities<br>• Learning is focused on the learner and their needs<br>• Learning is often linked to socialisation |

## Informal learning and the curriculum

One of the defining characteristics of informal learning is that it tends to defy organisation and location. For example, Moldovan and Bocoş-Binţinţan (2015) state that informal education "takes place in various unconventional locations [and] does not follow a hierarchy" (Moldovan & Bocoş-Binţinţan, 2015, p. 341).

When considering informality in schools or other learning institutions it is important to reflect on the Hidden Curriculum (HC) – sometimes referred to as the Implicit Curriculum (Inlay, 2003). The HC is commonly considered to be an element of the informal curriculum (Leask, 2009) and deals with concepts/elements such as values, norms, ethics, and emotions (Allaste et al., 2021; Atkinson, 1981; Aycicek, 2021; Bain, 1985). Significantly, the HC is largely implicit, for example, Aycicek (2021) states that it "refers to the program which is not explicitly expressed in the formal curriculum but influences students' lives and contains the norms and values of the society" (Aycicek, 2021, p. 280).

The HC is a form of socialisation (Ho, 2014; Jukić & Kakuk, 2019) that transmits the values and norms of the wider society through the values promoted by the school, and which learners need to master if they are to satisfactorily progress through school (and often beyond). According to Bray (2018) the HC is "communicated to students through various indirect means" (Bray et al., 2018, p. 437), sometimes without teachers realising it (Zorec & Došler, 2016). The HC includes the taken for granted hierarchic, authority roles and behaviour norms, and the knowledge and skills that are highly valued within educational institutions. These are communicated via a multitude of channels, including teachers' behaviours towards learners (Aycicek, 2021), learning organisation within the classroom and beyond (Leask, 2009), sanctioned texts and curriculum materials (Cornbleth, 1984), disciplinary measures, tracking systems (Martin, 1976), learner interactions and unwritten school rules (Aycicek, 2021). In essence, the HC is contingent on the minor elements of school-based interaction and behaviour that may not often be attended to.

In summary, the reviewed literature suggests that the ubiquity of informal learning means that it is a complex but powerful concept. This also creates a tension for curriculum thinking if we adopt a narrow concept of curriculum, such as Kerr (1968), which overly focuses on schools' explicit and planned control over the learning process. Informal learning lacks planning, but it can be relatively systematic if we consider how it works in organised education (i.e., schools and other learning institutions). Using the HC concept, we can recognise that informal learning is an implicit and real part of learners' educational experiences. This also means that we need a more expansive definition of curriculum, such as that of Kelly (2004), which recognises that the curriculum includes the totality of learner experiences during the education process (see Figure 5 below). This expanded definition legitimates research activity that looks at the implicit and behavioural aspects of the learning experiences in schools. It also places informal learning towards the edge of the educational experience in recognition that it has a socialisation function with regards to wider society (beyond purely educational goals).

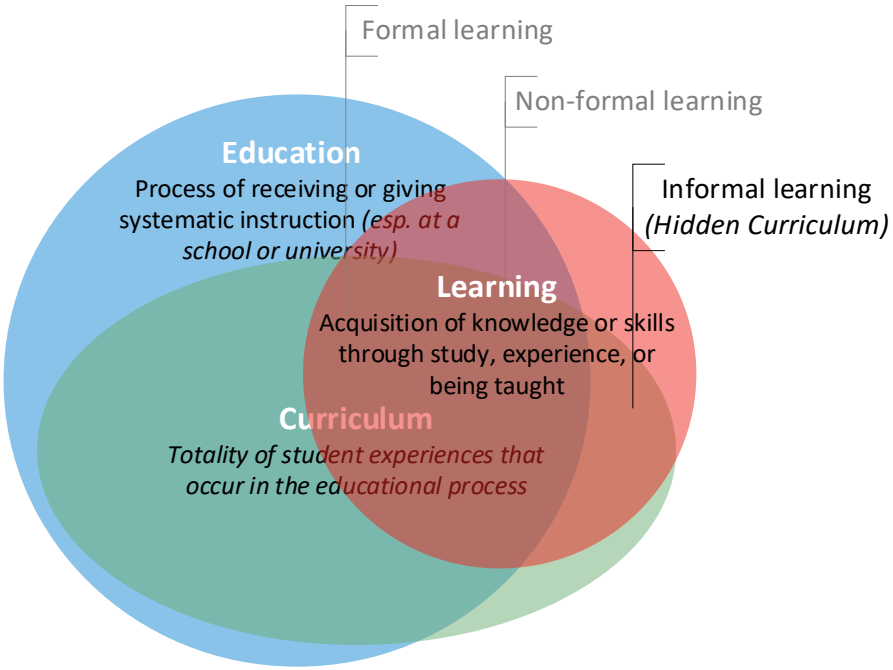


**Figure 5: Where informal learning is situated with regard to Education and an expanded Curriculum concept[9]**

## Benefits of informality in education

Informal learning is influential, accounting for an estimated 70−90% of all learning (Latchem, 2018, p. 6). It plays an important role in learners' socialisation and their adjustment to new environments (e.g., migrant learners into broader society, children into school, or workers into employment, see Jukić and Kakuk, 2019; Kaukko and Wilkinson, 2020; Livingstone, 2006), it helps to communicate the values, norms and actions that are seen as important in society (Aycicek, 2021; Bain, 1985), and can encourage the development of social skills through shared activity and social interaction (Läänemets et al., 2018).

Informal learning is considered to be implicitly engaging and motivating for the learner (McKay et al., 2013). Engagement is a spur to learning (Cain & Chapman, 2014) and capitalises on learners' innate curiosity (Cainey et al., 2012). The lack of educational structure and routine can also engage some learners who may not traditionally achieve in certain subject areas (McKay et al., 2013). The voluntary nature of informal learning invokes learner agency and means that the learner can "direct their study at a depth and breadth that serves their personal needs" (Wiebe et al., 2013, p. 3).

Commentators note that informal learning can complement formal education (Allaste et al., 2021; Leask, 2009), effectively achieving formal curriculum aims via different approaches (Wiebe et al., 2013, p. 3). For example, optional activities can be designed with elements of the formal curriculum (such as objectives) in mind. In support of the power of this interaction, out-of-school nature experiences have been found to be an important predictor of learners' interest in science, influence on longer term attitudes to subjects and career, and relatedness to a subject-based community and identity formation (LePendu et al., 2021; Lin & Schunn, 2016; Roberts et al., 2018; Wiebe et al., 2013). There is also compelling empirical evidence of the direct and positive relationship between informal science learning and

[9] Using expanded curriculum definition from Kelly (2004)

academic achievement (Tang and Zhang, 2020), with it influencing learners' self-efficacy perceptions (Lin & Schunn, 2016). These longer-term impacts of informal learning are picked up by Eisner (1992), who highlights how the HC can have long lasting, positive effects that are sometimes more powerful than those that stem from the formal curriculum. For example, Eisner states how "it has been argued by many scholars that the school's "implicit curriculum" is in the long run more powerful than what is explicitly taught" (Eisner, 1992, p. 6).

Informal learning can also complement the formal curriculum by promoting specific types of skills (that may be less possible to promote through more formal learning arrangements). For example, Carolan (2019) describes how the HC helps to develop soft skills (i.e., invention, self-direction, collaboration) through a theatre studies program, even though this is under recognised by the course teachers and administrators.

## Disadvantages of informality in education

Informal learning may only become visible to the learner once they interact with another person. This might be problematic as learning awareness might require an elicitation stage before it is recognised by the learner (Bourke et al., 2018). This model is an acknowledged component of Recognition of Prior Experiential Learning (RPEL) programmes (sometimes referred to as Accreditation of Prior Certified Learning (APCL), or Accreditation of Prior Experiential Learning' (APEL) (Bjørnåvold, 2000, p. 106)). These programmes aim to recognise learners' levels of knowledge and skills so that their placement in the learning and labour market is efficient and does not require learners to duplicate learning (Smith & Clayton, 2009). The potential for variances in the elicitation process means that informal learning gains can remain under-recognised and undervalued by the learner and others (Harris, 2012), which when translated to a societal level can lead to underpaid employment (Colley et al., 2003).

The opaque quality of HC content also has implications at the level of the learning institution. It is possible that educators may find themselves in situations where they are undermining their own goals (Rietveld, 2010). For example, Zajdel and Conn (2018) describe a situation where a school's promotion of fast food on campus served to undermine their intended healthy eating curriculum.

Informal learning approaches (e.g., experiential learning) may be less helpful than formal, didactic approaches for mastering conceptual material. It is possible that the apparently haphazard, context dependent character of informal learning may make it possible that a learner does not encounter generalisable concepts, or that gains are random and narrow (Dewey cited in Allsup, 2008: 6). For example, it is observed that formal pedagogies can be "more helpful than informal pedagogies for teaching conceptual material, knowledge about music and unfamiliar repertoire, i.e., 'knowledge of' music" (Cain & Chapman, 2014, p. 122).

This issue of learning context also has implications for learning transfer (the ability to apply the things learned in one context to a new and different context). There are some concerns around whether learners can take informal knowledge and apply it to other situations beyond the one where they were originally exposed to the knowledge. Discussing this issue of learning transfer in music education, McPhail states "the impression I was left with was that students were not gaining access to knowledge that might enable them to take largely

informal knowledge[10] beyond the confines of its social context" (McPhail, 2013, p. 7). It is also possible that the flow state of informal learning (i.e., the state of being 'absorbed' in a highly engaging activity) can reduce its potential impact. As some informal learning occurs without the awareness of the learner (Schugurensky, 2000), it is also possible that it does not result in higher concentration levels compared with formal learning (Hallam et al., 2018, p. 226).

For Bain (1985), a disadvantage of the HC is that it ensures that "schools contribute to the maintenance of political and economic systems of domination, exploitation, and inequality … e.g., class divisions; social hierarchies" (Bain, 1985, p. 147). A consequence of this is that it can perpetuate religious prejudices and stereotypes associated with different groups in society (Stojanoska et al., 2016). This issue raises the real concern that the HC can undermine equity through marginalising certain groups of learners (Kidman et al., 2013; H. J. Lee, 2011; Zhang & Luo, 2016).

The hidden messages, rules and norms of a school may not be completely understood by learners who have migrated from other countries or learners with special educational needs and disabilities, which in turn exclude them from social interactions. For instance, learners on the Autism Spectrum Conditions scale may find it difficult to understand social rules or norms that exist and are not communicated explicitly, and thus may feel different and excluded from participating in the school's social life (H. J. Lee, 2011). Learners who do not speak the language of the school they attend may also feel unable to take part (fully) in the life of the school. For example, Gaztambide-Fernández (2017) states that "children of immigrants and refugees attending public schools in "Western" countries face different kinds of hidden ideological forces that typically put them at risk of exclusion" (Gaztambide-Fernández, 2017, p. 142). Kidman et al. (2013) propose that:

> students who do not recognize the messages conveyed through the hidden curriculum about the kinds of knowledge orientations and ideal learner identities required for success in school science, or who do not have access to the means of enacting them, are more likely to find themselves excluded from critical pedagogical conversations geared towards moving students towards more advanced levels of learning (Kidman et al., 2013, p. 48).

This highlights that the HC can disadvantage some learners academically and socially as they may not be able to engage in learning if they struggle to follow or demonstrate the same behaviours as learners who understand and can follow the HC of their school. Some examples include Black, Latino/a and male students' disengagement through admonishment in the US (Langhout & Mitchell, 2008), indigenous Australian students' expectations of independent learning that conflict with school expectations (Rahman, 2013), and medical students' recognition of the need to build networks to acquire knowledge (Hill et al., 2014).

# Discussion and implications for research

Our review of the literature suggests that formal learning is relatively well-defined, in contrast with non-formal and informal learning. In this section we build on our review (which set out to clarify the definition of non-formal learning by situating it in relation to the other learning

[10] E.g., aurally derived improvisational practices and song writing knowledge.

types), and to consider the implications of these definitions for research and how we gather evidence of the different learning types.

We have outlined the characteristics, benefits, and disadvantages of the three learning types as conveyed in the research literature (presented in Table 4 to facilitate easy comparison). These learning characteristics include everything we picked up from the literature, but it is important to recognise that all of these characteristics do not need to be present at one time to categorise learning as formal, non-formal or informal. The complex nature of learning means that involuntary participation in schooled education (a hallmark of formal learning) may also involve a learner choosing whether to socially engage with specific opportunities (and access the HC).

**Table 4: Characteristics of formal, non-formal, and informal learning**

| Formal learning | Non-formal learning | Informal learning |
|---|---|---|
| Learning is structured (e.g., linear learning objectives) | Learning **may be** structured | Learning is not structured |
| Learning is promoted through direct teaching behaviours | Learning is promoted through indirect teaching behaviours | |
| Learning is intended (by educator and learner) | Learning is intended by the **learner** | Learning may not be intended by the learner |
| Learning is recognised by the learner and educator | Learning is recognised by the **learner** | Learning may not be recognised by the learner |
| Motivation for learning may be extrinsic to the learner | | Motivation for learning is intrinsic to the learner |
| Learning takes place in educational institutions | Learning **can** take place in educational institutions | Learning can take place anywhere |
| Learning has a mandated dimension | Learning has a voluntary dimension | |
| Learning may be recognised or measured through qualifications | | Learning is not recognised or measured through qualifications |
| Learning may primarily focus on propositional knowledge | Learning may focus on both propositional and procedural knowledge[11] | |
| Learning tends to have a cognitive emphasis | Learning involves cognitive, emotional, social and behavioural elements | |
| Curriculum is written down | Curriculum **may be** written down | Curriculum is not written down |
| Learning process is ‘top down’, focusing on developing specific knowledge and skills | Learning process is ‘bottom up’, focusing on the learner and their needs | |
| Learning follows formal curriculum | Learning may complement formal curricula | |
| Learning may not be linked to socialisation[12] | | Learning is often linked to socialisation |

## Formal learning and research methods

Each learning type is linked to the learning context in which it occurs, and this has implications for research investigations. Our literature review showed that there is consensus

[11] Propositional knowledge includes conceptual knowledge (e.g., ‘knowledge-that’) and contrasts with procedural knowledge which includes competencies, techniques and skills (e.g., ‘knowledge-how') (Rata, 2019).

[12] In this context, when referring to ‘socialisation’, we mean how learners might conform to the (often unwritten) norms and rules of educational settings such as schools.

around the characteristics of formal learning, such as structure, the role of educators and presence of direct teaching behaviours. This means that researching formal learning is less problematic than it is for other forms of learning.

Direct teaching behaviours (e.g., explaining, demonstrating, making corrections; Jung and Choi, 2016) that are a feature of formal learning can be captured by researchers through observation schedules, structured questions for interviews, and questionnaires. Formal learning is also often recognised through qualifications, and formal curricula tend to be written down alongside other policy documents. This means that researchers could look at existing documentary evidence (such as certificates, grades, curriculum objectives and standards) to investigate formal learning.

Formal learning has well-established evaluation and assessment methodologies, and testing has a long history of practice. Formal curricula are usually mandated at national level, and therefore most students should have experienced formal education. This means that formal learning may be more easily recognised by students, and therefore they may find it easier to describe their experiences of formal learning in interviews or questionnaires.

However, the formal curriculum does not fully describe everything that is happening in an educational context. This has important implications for educational studies, as formal learning processes do not include other important elements of the learning experience in schools and colleges (such as teachers' experiences and what students are learning beyond the prescribed content). Exclusive study of formal learning gives only a partial picture of the learning process, especially if we are investigating contexts that involve initiatives such as project-based learning or the International Baccalaureate Diploma Programme.

## Non-formal learning and research methods

Non-formal and informal learning are more difficult to define with clarity than formal learning, and this is in part because they share some overlaps. At the same time, non-formal and informal learning are commonly used terms across education, so it seems important to identify their characteristics to allow us to understand and explore them further.

Table 4 indicates how non-formal and informal learning differ and we can use this to focus on the implications for research and methods. Non-formal learning has some specific characteristics (e.g., it can be structured, written down, and be intrinsically motivated), but it also has a hybrid quality (involving characteristics of both formal and informal learning). This makes non-formal learning particularly interesting, and suggests that we need to consider using a diverse set of approaches to capture it.

Non-formal learning can be systematic and planned, and can occur in settings where formal, compulsory education is provided. It is intentional from the student's perspective and motivation for learning is more likely to come from the student than from other extrinsic factors, although extrinsic factors may be present (e.g., receiving a grade for playing a musical instrument). This means that some characteristics of non-formal learning should be relatively easy to identify through systematically observing learning or through speaking to students and teachers (e.g., through eliciting information about the locus of learning motivation from students) or studying curriculum policy documents and teachers' lesson plans.

Non-formal learning can share some characteristics of formal learning and curricula, such as following institutionalised frameworks, meaning that non-formal tasks and activities could be

structured and organised to support the context in which they are occurring (Moldovan & Bocoş-Binţinţan, 2015). For instance, a teacher running an after-school science club may write down a broad outline of what they want to cover in a specific session. Non-formal learning can be recognised and accredited, so we can look to these data as evidence of its impact in some cases.

Interactions between assessment arrangements and learning could be explored through teacher and student interviews and review of assessment documents. Although assessment is a feature of formal learning, it is possible that nuances of assessment practice (e.g., the agency relating to student choice in assessment topics influencing their motivation) may influence learning and place it into the non-formal sphere.

Non-formal learning is more flexible than learning in formal contexts (Ionescu, 2020). This means that non-formal curricula can focus on content that relates to learners' interests (e.g., focusing on content use in contexts that are meaningful to learners, or where learners exercise some choice in learning content). It also means that non-formal curricula can make it more possible to flexibly pace learning based on learner needs (e.g., address aspects that may be more relevant to learners' lives at the time, rather than focusing on covering set content or objectives in a very strict fashion). To capture evidence of learning flexibility we could look to details about course structures and to student reflections on their learning choices.

Non-formal learning, like informal learning, can take place anywhere. Semi-ethnographic methods, allowing for capture of features of the material environment can give insights into the processes of non-formal learning. Teacher and student interviews can allow the meanings attached to the way that the learning environment is arranged and can help to make clear some of the symbolic and material aspects of learning environments (e.g., seating arrangements, wall displays etc.).

Non-formal learning can be promoted through indirect teaching behaviours (Jung & Choi, 2016). These behaviours include interactional form (facial expression, gestures, voice). Capturing ITBs would involve questions for teachers and students as well as observation schedules that capture up to six ITB categories: (a) tone of voice and intonation, (b) humour, (c) facial expressions and gestures, (d) dress code and example, (e) touch, and (f) encouragement and care. Jung and Choi (2016) get to the heart of non-formality when they propose that we need to take a "more holistic approach" to understand teaching, especially as teachers often need to be skilful at showing both Direct Teaching Behaviours (DTBs) and ITBs. Studying non-formality could therefore help researchers and practitioners understand the totality of experiences that learners and teachers may be exposed to but may not necessarily be aware of.

Non-formal learning has a cognitive, emotional, social and behavioural emphasis, all of which can support the development of various skills such as communication, organisational, leadership, and social and inter-cultural skills (Läänemets et al., 2018; Souto-Otero, 2016). This means that students can gain vital life skills that can prepare them for future study, work or social interactions.

## Informal learning and research methods

Informal learning could be seen as a residual category of non-formal learning, which in turn is seen as a residual category of formal learning (Schugurensky, 2000, p. 2). Our analysis

makes some of the boundaries between non-formal and informal learning clearer, helping to overcome potential difficulties for investigating non-formal learning.

Considering that informal learning does not follow a structure and can happen anywhere, it may be difficult to observe when it is happening and to have complete confidence that it is happening. This is a challenge that makes reliance on teacher or student self-report for evidencing informal learning of limited research use. Informal learning is also less language-based than formal learning and could have non-verbal indicators, such as imitation, modelling, or trial and error processes (low stakes 'messing about'). Informal learning also includes the hidden curriculum (HC), which is linked to socialisation, values, norms, ethics and emotions - which are an important aspect of learning. This HC is often communicated to learners via indirect means (ITBs), such as instructor use of humour, engaging with others, using popular culture as a reference/task resource (Pienimäki et al., 2021, p. 5). This means that teachers may be unaware of any ‘social messages’ or ‘cues’ they give, and the impact these could have on learners, and the skills and experiences they gather as a result. Therefore, although we may need to examine symbols, well-defined roles, rules of thumb, well-tuned sensitivities, and embodied understandings (Kiilakoski & Kivijärvi, 2015, p. 53), we also need to understand how the more implicit elements of learning work and impact on learners.

Learners themselves may be unaware that any kind of learning is happening, which could make it difficult for them to talk about their experiences of informal learning. This means that we (researchers) must design tools that will be good at identifying and unpicking informal learning. We would need to make sure that we clearly define what we are looking for in observations and that we choose a method that can accurately capture informal learning (e.g., elements of ITBs).

However, we must leave space for any observations which we may not have anticipated when creating our methods and investigation tools. This is especially important as informal learning is often defined by what it is not rather than what it is.

# Conclusion

In conclusion, we note that non-formal and informal learning are complex but powerful concepts, and that they create a tension for curriculum thinking. Narrow concepts of curriculum leave little space to consider the unplanned and implicit aspects of learning (which can be a component of non-formal learning in schools). This means that educational research needs to adopt a broad concept of curriculum (such as that of Kelly, 2004) if it is to better understand learning in schools and also leverage all types of learning so learners and society can fulfil their potential.

We also note that non-formal and informal learning are more difficult to define with clarity than formal learning, and this is in part because they share some overlaps. This overlap carries implications, as it makes it more of a challenge to research non-formal and informal learning. Also, we note that the literature does not clearly distinguish between non-formal and informal learning, and in many instances, the two phrases are used interchangeably. It is perhaps most useful to consider non-formal learning as a hybrid of the other forms of learning, meaning that it is in the interaction of formal and informal elements that non-formality attains its special character.

This poses some difficulties for establishing the methods that would be best placed to study non-formal learning. Our literature review presents some clear distinctions between the different learning types so that there are some characteristics that can be used to differentiate how they differ (e.g., degree of structured articulation of learning objectives, learner intentionality and consciousness of learning, recognition of learning).

Our comprehensive review failed to identify any research that outlined a comprehensive methodology for gathering evidence of non-formal learning. In the appendix to this document, we use our literature review to identify the discriminating elements of learning and present them as a series of indicators (questions that a researcher may ask about a learning environment). These indicators are presented alongside a checklist of methods that tend to align with the different forms of learning.

It is possible that qualitative inquiry in an educational context might be able to pull apart some of the interacting aspects of learning and to further identify the character of non-formal learning (i.e., helping to further distinguish between the elements that appear to be common to both non-formal and informal learning). For example, through qualitative interviews and observations we may be able to consider how learner motivation may involve an interaction of intrinsic factors as well as other extrinsic factors (such as obtaining a grade in playing a musical instrument). Similarly, whilst informal learning can happen anywhere, such opportunities may only become available in more formal contexts (e.g., after-school clubs that happen at the end of a school day), rendering such learning as necessarily 'non-formal'. In contrast, informal learning typically occurs as a result of everyday experiences which are not necessarily connected to formal education contexts.

# References


Affeldt, F., Meinhart, D., & Eilks, I. (2018). The Use of Comics in Experimental Instructions in a Non-formal Chemistry Learning Context. *International Journal of Education in Mathematics, Science and Technology*, *6*(1), 1.

Afrik, T. (1995). *Basic adult non-formal education curricula: A Sub-Saharan African scenario* (p. 98). UNESCO.

Allaste, A.-A., Beilmann, M., & Pirk, R. (2021). Non-formal and Informal Learning as Citizenship Education: The Views of Young People and Youth Policymakers. *Journal of Applied Youth Studies*. https://doi.org/10.1007/s43151-021-00059-z

Allsup, R. E. (2008). Creating an Educational Framework for Popular Music in Public Schools: Anticipating the Second-Wave. *Visions of Research in Music Education*, *12*, 13.

Alnajjar, E. A. M. (2021). The Impact of a Proposed Science Informal Curriculum on Students' Achievement and Attitudes During the Covid-19. *International Journal of Early Childhood Special Education (INT-JECSE)*, *13*(2), 882–896. https://doi.org/10.9756/INT-JECSE/V13I2.211131

Atkinson, G. F. (1981). The implicit curriculum. *Journal of Chemical Education*, *58*(7), 560–561.

Aycicek, B. (2021). Metaphorical Perceptions of High School Teachers Regarding the Hidden Curriculum. *Shanlax International Journal of Education*, *9*(4), 280–293.

Badger, J. (2021). Learning in non-formal settings: Investigating cemetery guides' talk during school visits. *International Journal of Educational Research*, *109*, 101852. https://doi.org/10.1016/j.ijer.2021.101852

Bain, L. L. (1985). The Hidden Curriculum Re-examined. *Quest*, *37*(2), 145–153. https://doi.org/10.1080/00336297.1985.10483829

Bamkin, S. (2020). The taught curriculum of moral education at Japanese elementary school: The role of classtime in the broad curriculum. *Contemporary Japan*, *32*(2), 218–239. https://doi.org/10.1080/18692729.2020.1747780

Ben Zvi Assaraf, O. (2011). Learning from Failure: A Case Study of Where an Extracurricular Science Program Went Wrong. *Journal of Science Education and Technology*, *20*(5), 592–607. https://doi.org/10.1007/s10956-011-9327-y

Bernstein, B. (1971). On the Classification and Framing of Educational Knowledge. In M. Young (Ed.), *Knowledge and Control. New Directions for the Sociology of Education* (pp. 47–69). Collier Macmillan.

Bjørnåvold, J. (2000). *Making Learning Visible: Identification, Assessment and Recognition of Non-Formal Learning in Europe*. Cedefop.

Bourke, R., O'Neill, J., & Loveridge, J. (2018). Children's conceptions of informal and everyday learning. *Oxford Review of Education*, *44*(6), 771–786. https://doi.org/10.1080/03054985.2018.1450238

Bray, M., Kobakhidze, M. N., Zhang, W., & Liu, J. (2018). The hidden curriculum in a hidden marketplace: Relationships and values in Cambodia's shadow education system. *Journal of Curriculum Studies*, *50*(4), 435–455. https://doi.org/10.1080/00220272.2018.1461932

Brickhouse, N. W. (1989, March). Teachers' Content Knowledge about the Nature of Science and Its Relationship to Classroom Practice. *Annual Meeting of the American Educational Research Association*.

Cain, T., & Chapman, A. (2014). Dysfunctional dichotomies? Deflating bipolar constructions of curriculum and pedagogy through case studies from music and history. *The Curriculum Journal*, *25*(1), 111–129. https://doi.org/10.1080/09585176.2013.877396

Cainey, J., Bowker, R., Humphrey, L., & Murray, N. (2012). Assessing informal learning in an aquarium using pre- and post-visit drawings. *Educational Research and Evaluation*, *18*(3), 265–281. https://doi.org/10.1080/13803611.2012.670400

Carolan, C. (2019). An Informal Assessment of Twenty-First-Century Skills Developed Through Hidden Curriculum in Theatre Studies. *Theatre Research in Canada*, *39*(1), 1055470ar. https://doi.org/10.7202/1055470ar

Casey, A. (2017). Student interactions in the hidden curriculum. *European Physical Education Review*, *23*(3), 366–371. https://doi.org/10.1177/1356336X16642189

Chávez, R. C. (1984). The Use of High-Inference Measures To Study Classroom Climates: A Review. *Review of Educational Research*, *54*(2), 237–261.

Colley, H., Hodkinson, P., Malcolm, J., & Learning and Skills Research Centre. (2003). *Informality and formality in learning*. Learning and Skills Research Centre.

Coombs, P. H., & Ahmed, M. (1974). *Attacking Rural Poverty: How Nonformal Education Can Help. A Research Report for the World Bank Prepared by the International Council for Educational Development*. International Council for Educational Development.

Cornbleth, C. (1984). Beyond Hidden Curriculum? *Journal of Curriculum Studies*, *16*(1), 29–36. https://doi.org/10.1080/0022027840160105

Council of Europe. (2022). *Formal, non-formal and informal learning*. Linguistic Integration of Adult Migrants (LIAM). https://www.coe.int/en/web/lang-migrants/formal-non-formal-and-informal-learning

Dovey, K., & Fisher, K. (2014). Designing for adaptation: The school as socio-spatial assemblage. *The Journal of Architecture*, *19*(1), 43–63. https://doi.org/10.1080/13602365.2014.882376

Eisner, E. W. (1992, September 14). The Role of Education in the Cultural and Artistic Development of the Individual. *Proceedings of the UNESCO International Conference on Education (43rd Session)*.

Endeley, M. N., & Zama, M. M. A. (2021). *Perspectives in Curriculum Studies*. Spears Books.

Eraut, M. (2004). Informal learning in the workplace. *Studies in Continuing Education*, *26*(2), 247–273. https://doi.org/10.1080/158037042000225245

Eshach, H. (2007). Bridging In-school and Out-of-school Learning: Formal, Non-Formal, and Informal Education. *Journal of Science Education and Technology*, *16*(2), 171–190. https://doi.org/10.1007/s10956-006-9027-1

Evans, S. E., Beauchamp, G., & John, V. (2015). Learners' experience and perceptions of informal learning in Key Stage 3 music: A collective case study, exploring the implementation of Musical Futures in three secondary schools in Wales. *Music Education Research*, *17*(1), 1–16. https://doi.org/10.1080/14613808.2014.950212

Filippoupoliti, A., & Koliopoulos, D. (2014). Informal and Non-formal Education: An Outline of History of Science in Museums. *Science & Education*, *23*(4), 781–791. https://doi.org/10.1007/s11191-014-9681-2

Frappart, S., & Frède, V. (2016). Conceptual change about outer space: How does informal training combined with formal teaching affect seventh graders' understanding of gravitation? *European Journal of Psychology of Education*, *31*(4), 515–535. https://doi.org/10.1007/s10212-015-0275-4

Gage, N., Low, B., & Reyes, F. L. (2020). Listen to the tastemakers: Building an urban arts high school music curriculum. *Research Studies in Music Education*, *42*(1), 19–36. https://doi.org/10.1177/1321103X19837758

Garner, N., Siol, A., & Eilks, I. (2015). The Potential of Non-Formal Laboratory Environments for Innovating the Chemistry Curriculum and Promoting Secondary School Level Students Education for Sustainability. *Sustainability*, *7*(2), 2. https://doi.org/10.3390/su7021798

Gaztambide-Fernández, R. (2017). Tracing and countering the "hidden." *Curriculum Inquiry*, *47*(3), 241–245. https://doi.org/10.1080/03626784.2017.1348778

Gee, K. A. (2015). Achieving gender equality in learning outcomes: Evidence from a non-formal education program in Bangladesh. *International Journal of Educational Development*, *40*, 207–216. https://doi.org/10.1016/j.ijedudev.2014.09.001

Giroux, H. A., & Penna, A. N. (1979). Social Education in the Classroom: The Dynamics of the Hidden Curriculum. *Theory & Research in Social Education*, *7*(1), 21–42. https://doi.org/10.1080/00933104.1979.10506048

Gloria, R., Tatiana, D., Constantin, R. B., & Marinela, R. (2014). The Effectiveness of Non-formal Education in Improving the Effort Capacity in Middle-school Pupils. *Procedia - Social and Behavioral Sciences*, *116*, 2722–2726. https://doi.org/10.1016/j.sbspro.2014.01.643

Gower, A. (2012). Integrating informal learning approaches into the formal learning environment of mainstream secondary schools in England. *British Journal of Music Education*, *29*(1), 13–18. https://doi.org/10.1017/S0265051711000490

Hallam, S., Creech, A., & McQueen, H. (2018). Pupils' perceptions of informal learning in school music lessons. *Music Education Research*, *20*(2), 213–230. https://doi.org/10.1080/14613808.2016.1249358

Harris, M. S. G. (2012). Fulfilling a European Vision through Flexible Learning and Choice. *European Journal of Education*, *47*(3), 424–434. https://doi.org/10.1111/j.1465-3435.2012.01535.x

Hidayat, S., Ruhiat, Y., & Syafrizal. (2016). Mentoring and Curriculum Development Model to Improve Quality of nonformal Education (NFE) in Banten Province. *Proceeding, 3rd NFE Conference on Lifelong Learning*, *88*(03), 03.

Hill, E., Bowman, K., Stalmeijer, R., & Hart, J. (2014). You've got to know the rules to play the game: How medical students negotiate the hidden curriculum of surgical careers. *Medical Education*, *48*(9), 884–894. https://doi.org/10.1111/medu.12488

Ho, W.-C. (2014). Music education curriculum and social change: A study of popular music in secondary schools in Beijing, China. *Music Education Research*, *16*(3), 267–289. https://doi.org/10.1080/14613808.2014.910182

Inlay, L. (2003). Values: The Implicit Curriculum. *Educational Leadership*, *60*(6), 69–71.

Ionescu, F. (2020). Non-formal education approaches in school organization methodological aspects and case study. *Journal of Education, Society & Multiculturalism*, *1*(2).

Ivanova, I. V. (2016). Non-formal Education: Investing in Human Capital. *Russian Education & Society*, *58*(11), 718–731. https://doi.org/10.1080/10609393.2017.1342195

Johansson, I. (2003). Transition from School to After-school Day-care: Interplay Between Formal and Informal Learning Processes. *European Early Childhood Education Research Journal*, *11*(sup1), 109–118. https://doi.org/10.1080/1350293X.2003.12016709

Johnson, M., & Oates, T. (2016). Making Sense of a Learning Space: How Freestyle Scooter-riders Learn in a Skate Park. *Informal Learning Review*, *140*, 17–21.

Jukić, R., & Kakuk, S. (2019). *Socialization Role of School and Hidden Curriculum*. 3404–3412. https://doi.org/10.21125/edulearn.2019.0910

Jung, H., & Choi, E. (2016). The importance of indirect teaching behaviour and its educational effects in physical education. *Physical Education and Sport Pedagogy*, *21*(2), 121–136. https://doi.org/10.1080/17408989.2014.923990

Kaukko, M., & Wilkinson, J. (2020). 'Learning how to go on': Refugee students and informal learning practices. *International Journal of Inclusive Education*, *24*(11), 1175–1193. https://doi.org/10.1080/13603116.2018.1514080

Kelly, A. V. (2004). *The Curriculum: Theory and Practice* (5th ed.). SAGE Publications Ltd.

Kerr, J. F. (Ed.). (1968). *Changing the Curriculum*. University of London Press.

Kidman, J., Yen, C.-F., & Abrams, E. (2013). Indigenous Students' Experiences of the Hidden Curriculum in Science Education: A Cross-National Study in New Zealand and Taiwan. *International Journal of Science and Mathematics Education*, *11*(1), 43–64. https://doi.org/10.1007/s10763-012-9365-9

Kiilakoski, T., & Kivijärvi, A. (2015). Youth clubs as spaces of non-formal learning: Professional idealism meets the spatiality experienced by young people in Finland. *Studies in Continuing Education*, *37*(1), 47–61. https://doi.org/10.1080/0158037X.2014.967345

Kral, I., & Heath, S. B. (2013). The world with us: Sight and sound in the "cultural flows" of informal learning. An Indigenous Australian case. *Learning, Culture and Social Interaction*, *2*(4), 227–237. https://doi.org/10.1016/j.lcsi.2013.07.002

Läänemets, U., Kalamees-Ruubel, K., Kiilu, K., & Sepp, A. (2018). Curriculum Development Considering Formal, Non-Formal and Informal Education. *SOCIETY. INTEGRATION. EDUCATION. Proceedings of the International Scientific Conference*, *2*(0), 0. https://doi.org/10.17770/sie2018vol1.3182

Langhout, R. D., & Mitchell, C. A. (2008). Engaging contexts: Drawing the link between student and teacher experiences of the hidden curriculum. *Journal of Community & Applied Social Psychology*, *18*(6), 593–614. https://doi.org/10.1002/casp.974

Latchem, C. (2018). Open and Distance Non-formal Education. In C. Latchem (Ed.), *Open and Distance Non-formal Education in Developing Countries* (pp. 11–17). Springer. https://doi.org/10.1007/978-981-10-6741-9_2

Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge University Press.

Leask, B. (2009). Using Formal and Informal Curricula to Improve Interactions Between Home and International Students. *Journal of Studies in International Education*, *13*(2), 205–221. https://doi.org/10.1177/1028315308329786

Lee, A. N. (2012). Development of a parent's guide for the Singapore primary science curriculum: Empowering parents as facilitators of their children's science learning outside the formal classrooms. *Asia-Pacific Forum on Science Learning and Teaching*, *13*(2), 1–27.

Lee, H. J. (2011). Cultural Factors Related to the Hidden Curriculum for Students with Autism and Related Disabilities. *Intervention in School and Clinic*, *46*(3), 141–149. https://doi.org/10.1177/1053451210378162

LePendu, P., Cheung, C., Salloum, M., Sheffler, P., & Downey, K. (2021, July 26). *Summer Coding Camp: Curriculum, Experiences, and Evaluation*. 2021 ASEE Virtual Annual Conference Content Access. https://peer.asee.org/summer-coding-camp-curriculum-experiences-and-evaluation

Lin, P.-Y., & Schunn, C. D. (2016). The dimensions and impact of informal science learning experiences on middle schoolers' attitudes and abilities in science. *International Journal of Science Education*, *38*(17), 2551–2572. https://doi.org/10.1080/09500693.2016.1251631

Livingstone, D. W. (2006). Informal Learning: Conceptual Distinctions and Preliminary Findings. *Counterpoints*, *249*, 203–227.

Madjar, N., & Cohen-Malayev, M. (2013). Youth movements as educational settings promoting personal development: Comparing motivation and identity formation in formal and non-formal education contexts. *International Journal of Educational Research*, *62*, 162–174. https://doi.org/10.1016/j.ijer.2013.09.002

Martin, J. R. (1976). What Should We Do with a Hidden Curriculum When We Find One? *Curriculum Inquiry*, *6*(2), 135–151. https://doi.org/10.1080/03626784.1976.11075525

McKay, M. M., Lowes, S., Tirthali, D., McGrath, E. W., Sayres, J., & Peterson, K. A. D. (2013). *Transforming a Middle and High School Robotics Curriculum*. 23.1267.1-23.1267.21. https://peer.asee.org/transforming-a-middle-and-high-school-robotics-curriculum

McPhail, G. (2013). Informal and formal knowledge: The curriculum conception of two rock graduates. *British Journal of Music Education*, *30*(1), 43–57. https://doi.org/10.1017/S0265051712000228

Melnic, A.-S., & Botez, N. (2014). Formal, Non-Formal and Informal Interdependence in Education. *Economy Transdisciplinarity Cognition*, *17*(1), 113–118.

Młynarczuk-Sokołowska, A. (2022). Intercultural non-formal education: What the children think. *Intercultural Education*, *33*(1), 82–98. https://doi.org/10.1080/14675986.2021.2018171

Mok, O. N. A. (2011). Non-formal learning: Clarification of the concept and its application in music learning. *Australian Journal of Music Education*, *1*, 11–15.

Moldovan, O., & Bocoş-Binţinţan, V. (2015). The Necessity of Reconsidering the Concept of Non-formal Education. *Procedia - Social and Behavioral Sciences*, *209*, 337–343. https://doi.org/10.1016/j.sbspro.2015.11.245

Morgan, J. (2015). Michael Young and the Politics of the School Curriculum. *British Journal of Educational Studies*, *63*(1), 5–22. https://doi.org/10.1080/00071005.2014.983044

Morris, T. H. (2019). Self-directed learning: A fundamental competence in a rapidly changing world. *International Review of Education*, *65*(4), 633–653. https://doi.org/10.1007/s11159-019-09793-2

Norqvist, L., & Leffler, E. (2017). Learning in non-formal education: Is it "youthful" for youth in action? *International Review of Education*, *63*(2), 235–256. https://doi.org/10.1007/s11159-017-9631-8

Nussbaum, J., & Novak, J. D. (1976). An assessment of children's concepts of the earth utilizing structured interviews. *Science Education*, *60*(4), 535–550. https://doi.org/10.1002/sce.3730600414

Pienimäki, M., Kinnula, M., & Iivari, N. (2021). Finding fun in non-formal technology education. *International Journal of Child-Computer Interaction*, *29*, 100283. https://doi.org/10.1016/j.ijcci.2021.100283

Powdyel, T. S. (2016). Non-Formal Education in Bhutan: Origin, Evolution, and Impact. In M. J. Schuelka & T. W. Maxwell (Eds.), *Education in Bhutan: Culture, Schooling, and Gross National Happiness* (pp. 169–180). Springer. https://doi.org/10.1007/978-981-10-1649-3_11

Radović, S., & Passey, D. (2016). Digital resource developments for mathematics education involving homework across formal, non-formal and informal settings. *The Curriculum Journal*, *27*(4), 538–559. https://doi.org/10.1080/09585176.2016.1158726

Rahman, K. (2013). Belonging and learning to belong in school: The implications of the hidden curriculum for indigenous students. *Discourse: Studies in the Cultural Politics of Education*, *34*(5), 660–672. https://doi.org/10.1080/01596306.2013.728362

Rannala, I.-E., & Dibou, T. (2020). Non-formal learning in youth work: Questions and examples inspired from Estonian youth work. *Youth Voice Journal*.

Rata, E. (2019). Knowledge-rich teaching: A model of curriculum design coherence. *British Educational Research Journal*, *45*(4), 681–697. https://doi.org/10.1002/berj.3520

Rietveld, C. (2010). Early Childhood Inclusion: The Hidden Curriculum of Peer Relationships. *New Zealand Journal of Educational Studies*, *45*(1), 17–32.

Roberts, T., Jackson, C., Mohr-Schroeder, M. J., Bush, S. B., Maiorca, C., Cavalcanti, M., Craig Schroeder, D., Delaney, A., Putnam, L., & Cremeans, C. (2018). Students' perceptions of STEM learning after participating in a summer informal learning experience. *International Journal of STEM Education*, *5*(1), 35. https://doi.org/10.1186/s40594-018-0133-4

Romi, S., & Schmida, M. (2009). Non-formal education: A major educational force in the postmodern era. *Cambridge Journal of Education*, *39*(2), 257–273. https://doi.org/10.1080/03057640902904472

Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional Science*, *18*(2), 119–144. https://doi.org/10.1007/BF00117714

Schugurensky, D. (2000). *The Forms of Informal Learning: Towards a Conceptualization of the Field* (WALL Working Paper No.19; p. 9). Ontario Institute for Studies in Education of the University of Toronto.

Scribner, S., & Cole, M. (1973). Cognitive Consequences of Formal and Informal Education. *Science*, *182*(4112), 553–559. https://doi.org/10.1126/science.182.4112.553

Simac, J., Marcus, R., & Harper, C. (2021). Does non-formal education have lasting effects? *Compare: A Journal of Comparative and International Education*, *51*(5), 706–724. https://doi.org/10.1080/03057925.2019.1669011

Smith, L., & Clayton, B. (2009). *Recognising non-formal and informal learning: Participant insights and perspectives.* NCVER. https://www.voced.edu.au/content/ngv:40523

Souto-Otero, M. (2016). Young people's views of the outcomes of non-formal education in youth organisations: Its effects on human, social and psychological capital, employability and employment. *Journal of Youth Studies*, *19*(7), 938–956. https://doi.org/10.1080/13676261.2015.1123234

Souto-Otero, M. (2021). Validation of non-formal and informal learning in formal education: Covert and overt. *European Journal of Education*, *56*(3), 365–379. https://doi.org/10.1111/ejed.12464

Stojanoska, G., Andonovska-Trajkovska, D., & Zhoglev, Z. (2016). *Hidden Curriculum in the Primary Schools in The Republic of Macedonia: Content Analysis of the History Textbooks*. 1610–1618. https://doi.org/10.21125/inted.2016.1345

Straka, G. A. (2004). *Informal learning: Genealogy, concepts, antagonisms and questions*. Institut Technik und Bildung, Universität Bremen. http://nbn-resolving.de/urn:nbn:de:0111-opus-91627

Sud, P. (2010). Can non-formal education keep working children in school? A case study from Punjab, India. *Journal of Education and Work*, *23*(1), 1–26. https://doi.org/10.1080/13639080903448300

Tang, X., & Zhang, D. (2020). How informal science learning experience influences students' science performance: A cross-cultural study based on PISA 2015. *International Journal of Science Education*, *42*(4), 598–616. https://doi.org/10.1080/09500693.2020.1719290

VERBI Software. (2021). *MAXQDA 2022*. https://maxqda.com

Werquin, P. (2010). *Recognising Non-Formal and Informal Learning: Outcomes, Policies and Practices*. OECD. https://www.oecd.org/education/skills-beyond-school/recognitionofnon-formalandinformallearning-home.htm

Wiebe, E. N., Faber, M., Corn, J., Collins, T. L., Unfried, A., & Townsend, L. (2013, June 23). *A Large-scale Survey of K-12 Students about STEM: Implications for Engineering Curriculum Development and Outreach Efforts (Research to Practice)*. 2013 ASEE Annual Conference & Exposition, Atlanta, GE. https://peer.asee.org/a-large-scale-survey-of-k-12-students-about-stem-implications-for-engineering-curriculum-development-and-outreach-efforts-research-to-practice

Wilkinson, M. L. N. (2014). The concept of the absent curriculum: The case of the Muslim contribution and the English National Curriculum for history. *Journal of Curriculum Studies*, *46*(4), 419–440. https://doi.org/10.1080/00220272.2013.869838

Yeasmin, N., Uusiautti, S., & Määttä, K. (2020). Is non-formal learning a solution to enhance immigrant children's empowerment in northern Finnish communities? *Migration and Development*, 1–19. https://doi.org/10.1080/21632324.2020.1742993

Young, M., & Muller, J. (2013). On the powers of powerful knowledge. *Review of Education*, *1*(3), 229–250. https://doi.org/10.1002/rev3.3017

Zajdel, J., & Conn, D. R. (2018). Advertising “Generosity” in Schools: Do You Want Fries with Your Curriculum? *Curriculum and Teaching Dialogue*, *20*, 71–86.

Zhang, D., & Luo, Y. (2016). Social Exclusion and the Hidden Curriculum: The Schooling Experiences of Chinese Rural Migrant Children in an Urban Public School. *British Journal of Educational Studies*, *64*(2), 215–234. https://doi.org/10.1080/00071005.2015.1105359

Zorec, M. B., & Došler, A. J. (2016). Rethinking the hidden curriculum: Daily routine in Slovene preschools. *European Early Childhood Education Research Journal*, *24*(1), 103–114. https://doi.org/10.1080/1350293X.2015.1120523

Zupančič, V. M. (2018). Taxonomy of Teaching Methods and Teaching Forms for Youth in Non-Formal Education in the National Youth Council of Slovenia. *Center for Educational Policy Studies Journal*, *8*(1), 1. https://doi.org/10.26529/cepsj.491

# Appendix: Indicators of learning types and methods checklist

**Indicators of learning types (F: formal; N-f: non-formal; I: informal)**

| | F | N-f | I |
|---|---|---|---|
| Is learning structured around a sequence of learning objectives? | Y | Y | N |
| Is learning pre-planned? | Y | Y | N |
| Is there flexibility to adapt the learning programme? | N | Y | Y |
| Is learning content documented? | Y | N | N |
| Does learning involve mainly direct teaching behaviours?[13] | Y | N | N |
| Is learning organised through teaching contact hours? | Y | N | N |
| Is learning uncertificated (no qualification)? | N | - | Y |
| Is learning planned and intended by the educator? | Y | Y | N |
| Is learning planned and intended by the learner? | Y | Y | N |
| Does the learner recognise that they are learning? | Y | Y | N |
| Does learning take place outside of an educational institution? | N | - | Y |
| Is learning compulsory? | Y | N | N |
| Does learning mainly focus on propositional knowledge? | Y | N | N |
| Does learning mainly focus on practical, applied knowledge? | N | - | Y |
| Does learning have a social, emotional, or behavioural focus? | N | Y | Y |
| Does the main pedagogic interaction involve teacher and learner? | Y | N | N |
| Is learning primarily experience-based? | N | Y | Y |
| Are learning standards/expectations primarily focused on learner needs? | N | Y | Y |
| Can learners choose learning content within a course of study? | N | Y | Y |
| Can learners choose to participate in learning? | N | Y | Y |
| Is motivation for learning intrinsic to the learner? | N | Y | Y |
| Is learning spontaneous? | N | N | Y |
| Does learning involve socialisation?[14] | N | N | Y |

**Methods**

| | F | N-f | I |
|---|---|---|---|
| Observer field notes (unstructured) | N | Y | Y |
| Observations (e.g., of non-verbal behaviours) | N | Y | Y |
| Learning environment analysis | N | Y | Y |
| Student and teacher questionnaires | Y | Y | N |
| Student and teacher interviews | N | Y | Y |
| Study of learning contact hours | Y | N | N |
| Examination grades review | Y | Y | N |
| Policy documents review | Y | Y | N |
| Examination/Assessment tools review | Y | Y | N |
| Schemes of work review | Y | Y | N |
| Assignments review | Y | Y | N |
| Learning outcomes measurement | Y | Y | N |
| Teaching and lesson plans review | Y | Y | N |
| Observing laboratory sessions/other practical activities | Y | Y | N |

[13] Direct teaching behaviours: Demonstrating; Explaining; Giving feedback; Making corrections; Setting goals; Instruction. Indirect teaching behaviours: Teachers' facial expressions; Gestures; Tone of voice; Intonation; Humour; Dress code; Touch; Encouragement; Care (e.g., non-verbal modelling)

[14] In this context, when referring to 'socialisation', we mean how learners might conform to the (often unwritten) norms and rules of educational settings such as schools