Levels of literacy. Some anthropological and semiotic considerations on children, object interactions and literacy

Klaus-Christian Zehbe

Research Associate in Primary Didactics, Social Sciences at Leipzig University, Germany
klaus-christian.zehbe@uni-leipzig.de

Introduction

Literacy[1] is a long-established concept in psychological and quantitative educational research (cf. Artelt et al., 2001), going back as far as the early 1970s (Thorndike, 1973). In the course of educational research and large-scale assessments, especially in the framework of the Programme for International Student Assessment (PISA) of the Organisation for Economic Co-operation and Development (OECD, 1999, 2023), the concept has undergone several changes and has established itself meanwhile firmly in international educational policy discourse. Literacy is now understood to go well beyond the meaning of having "the ability to read and write" (Oxford English Dictionary, n. d.). The United Nations Educational Scientific and Cultural Organisation (UNESCO, 2024) defines literacy as follows:

> Acquiring literacy is not a one-off act. Beyond its conventional concept as a set of reading, writing and counting skills, literacy is now understood as a means of identification, understanding, interpretation, creation, and communication in an increasingly digital, text-mediated, information-rich and fast-changing world. Literacy is a continuum of learning and proficiency in reading, writing and using numbers throughout life and is part of a larger set of skills, which include digital skills, media literacy, education for sustainable development and global citizenship as well as job-specific skills. Literacy skills themselves are expanding

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1. Literacy is in the following both used in a general as well as in a specific, circumscribed meaning. To distinguish between the uses, literacy without single quotation marks refers to a general use, whereas 'literacy' in single quotation marks refers to the word's specific, hereafter outlined use.

and evolving as people engage more and more with information and learning through digital technology. (UNESCO, 2024).

However, in the context of primary school children, it is useful to re-examine the concept of literacy in light of the processes involved in becoming literate, i. e. becoming active and competent members of society in UNESCO's sense. This usually means for primary school children first and foremost learning how to deal with their everyday lifeworld as well as learning how to read, write and count. Here it is necessary to make a distinction between 'alphabetization' in the strict sense of 'learning how to read and write using the phonetic alphabet' and 'literacy' as a 'competent[2] activity in a given context'. These processes of learning how to deal with the lifeworld competently will be discussed in the framework of object interactions, focusing on "object literacy" (Leahy, 1995, p. 17), i. e. "a special skill gained through the process of discovery and discussion about original objects." This raises the question about the processes how object literacy is acquired. According to Littleton (1995, p. 8), some of the techniques involved in the process of alphabetization, i. e. of learning how to read and write with the phonetic alphabet, can be equally used to understand how to 'read' objects. As such, object literacy seems connected to the general processes of human semiosis, i. e. according to Peirce "an action, an influence, which is, or involves a cooperation of *three* subjects, such as a sign, its object and its interpretant" (CP 5.484, original emphasis) in meaning-making.

To substantiate Littleton's claim, characteristics of acquiring literacy will be elaborated in a first step on the basis of considerations of McLuhan and Littleton on alphabetization. Since primary school children have to be considered alphabetized from a certain age, but not fully literate in the sense of UNESCO, the state of being pre-alphabetized is reconstructed in a second step from anthropological observations in a society not using a phonetic alphabet. This reconstruction of pre-alphabetization will serve as a reference point against which alphabetization as well as potential perspectives of primary school children can be assessed. In a third step, these considerations are brought to bear on primary school children's object interactions and their

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2. Competent is here understood as: "the ability to meet individual or social demands successfully, or to carry out an activity or task. This external, demand-oriented, or functional approach has the advantage of placing at the forefront the personal and social demands facing individuals. This demand-oriented definition needs to be complemented by a conceptualization of competencies as internal mental structures – in the sense of abilities, capacities or dispositions embedded in the individual. Each competence is built on a combination of interrelated cognitive and practical skills, knowledge (including tacit knowledge), motivation, value orientation, attitudes, emotions, and other social and behavioural components that together can be mobilized for effective action." (OECD, 2002, p. 8)

search for meanings. On the basis of empirical material it will be discussed how children's object interactions may show different forms of emergent 'object literacy'. The article concludes with a summary and an outlook how different 'literacies' can contribute to transgenerational dialogue between children and adults.

1. Construction of Alphabetization and Literacy

Becoming literate, i. e. learning how to read, write and count, is a central part of most primary education systems, however, how to become 'object literate' is rarely considered in primary school, as this is apparently acquired through a series of experiences with objects in everyday life. For Littleton (1995, p. 8 ff.) both acquiring literacy in the sense of alphabetization and acquiring visual, or object literacy share certain principles. With some modifications, Littleton's observations on visual alphabetization in a museum context can be broken down into four basic processes resulting in literacy: (1) learning to discriminate, i. e. being able to differentiate between sensory information or learning to 'tell apart', (2) learning to combine, i. e. being able to combine different sensory information into units or learning to 'put together' and closely connected to this, (3) learning to attribute, i. e. being able to attribute personal or current meanings or learning to 'give meanings' and finally (4) learning to contextualize, i. e. being able to set elements or units of elements into wider contexts – which is again closely connected to the ability of attributing meanings, but which is perhaps best described as learning to 'refer to antecedent meanings'. This latter ability requires that people are aware of and remember antecedent meanings. In doing so, longer sentences and texts can be created as well as words, sentences and texts which can refer to meanings of other people. Remembering meanings makes it also possible to predict subsequent meanings, such as Piai et al. (2016) have shown on the basis of restricted sentences, i. e. sentences where a part of a collocation – a combination of words which usually go together – is missing, such as "She locked the door with a ___." (ibid., p. 11366). According to Piai et al. (2016), memories are used for predicting subsequent words and meanings; in the case of the previous sentence to predict "key" as the missing word. It becomes clear, that the ability to successfully contextualize depends on a store or an "encyclopedia" (Bonfantini & Proni, 1983, p. 134) of previous experiences and thus correlates directly to an understanding of 'literacy' as a successful analysis of given sensory information in a specific context and a competent reaction to this information. In summary, the processes of discriminating and combining graphemes and phonemes can be analytically described with the term 'alphabetization' for cultures using a phonetic alphabet whereas all the processes of discrimi-

nating, combining, attributing and contextualizing can be characterized as semiotic core processes of 'literacy'.

Primary school children are of particular interest to examine these processes, because they are in the process of both being alphabetized and acquiring literacy – or to put it more generally in the terms of Marshal McLuhan (2011, p. 40): primary school children are learning how to "break [...] apart sight and sound and meaning which is key to the phonetic alphabet", i. e. being able to analytically distinguish between the sensory information provided by graphemes (sight) and phonemes (sound) and its associated meanings.

Fig. 1 shows part of a writing exercise of a German primary school child. The exercise shows McLuhan's three dimensions of alphabetization: (1) the graphemes of "U" and "u" which visually and symbolically stand for all words and sounds containing these, (2) some phonemes, here particularly the phonetic representations of the German "u" sound in the word "Unfal" [ˈʊnfal] and *Uhr* [uːɐ̯] as well as (3) two possible meanings by showing the written representation "Unfal" (*Unfall*, i. e. accident) and a pictorial representation of an object which is spelled with the letter "u" (*Uhr*) [uːɐ̯], i. e. a clock. It is the spelling of "Unfal" – in contrast to the correct German spelling *Unfall* – which suggests that the letters are here a phonetic representation of the sounds [ˈʊnfal] for the child.
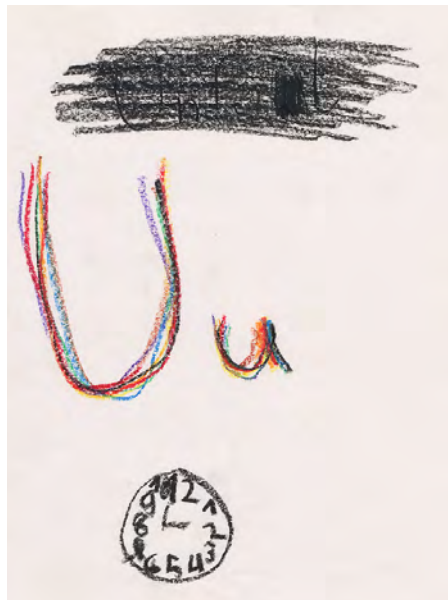

Fig. 1 – Urayama, Z. J. (2015). *Big U small u.* Copy in possession of author.

Once a child has learned to discriminate and reproduce the different conventional graphemes and their connection to the phonemes, it can combine these into units which can be given personal meanings: for example, the graphemes 'n', 'e' and 'w' may be combined in current English to the written word 'new', but not to 'enw', whereas the combinations of 'ewn', 'nwe', 'wen' or 'wne' are obsolete and hardly used. It becomes clear that combinations of phonemes and graphemes are not completely free but are governed by rules of the speech community. The same rule-based processes of discrimination, combination, and attribution operate not only on a word, but also on a sentence as well as a text level, where they are described by the linguistic domains of lexicon, syntax and semantics. With increasing practice these processes are becoming 'second nature' to people and will be executed almost effortlessly and 'unthinkingly', however deviations from accepted norms in the speech community will be equally remarked, as is used by Rodari (2008) for humorous effect in his short story for children *Tante domande* (2008, 101 f.) and as is described formally by Chomsky (1957) in the context of syntactic structures.

While it is sufficiently clear that the processes of discrimination, combination and attribution are both involved in mastering spoken as well as written utterances and to communicate personal meanings, the ability to contextualize meanings emerges from remembering previous meanings and to elaborate on them. In Europe, the disciplines of rhetoric and logic – and especially the crosscutting topics – can be seen as systematic approaches for contextualizing meanings. Dealing with how to properly combine ideas in spoken utterances and larger bodies of written text, rhetoric and logic are, however, often seen in terms of the effects they are intended to produce: for logic how to arrive at true statements and for rhetoric how to convince other people through spoken or written utterances.

Having outlined the processes involved in becoming 'literate' – i. e. breaking apart sight, sound and meaning as well as telling elements apart, putting elements together, giving meanings to elements and referring to other meanings – it is now necessary to develop an understanding of what it means to be in the process of achieving 'literacy' – such as primary school children are. To assess these processes, a state of 'before' being literate will be reconstructed as a heuristic proxy for the position of primary school children in this process. Since children are competent actors in their respective life worlds (cf. James & Prout, 2015) and must be therefore considered 'literate' in a semiotic sense, I will here reconstruct the state of being pre-alphabetized as a theoretical reference point.

2. Reconstruction of Being Pre-alphabetized

According to current projections, more than eight billion people live on earth to date (United Nations Department of Economic and Social Affairs, Population Division, 2022). Out of these, approx. 86 per cent of people of 15 years or older can read and write (UNESCO, 2024). For industrialized countries – such as Italy or Germany – the literacy rate of the group of 15 years and older is considered close to 99 per cent or above. Without qualitative empirical data, it is difficult to assess what it means to be illiterate or functionally illiterate – here used as a descriptive term of not being able to read or write in a systematic way. However, on the basis of historical, anthropological observations in societies not using a phonetic writing system, some aspects of illiteracy – or pre-alphabetization – can be reconstructed. In an oral presentation at Teachers College, Columbia University, on May 2, 1961, John Wilson describes an educational film screening in West Africa in a colonial – pre-alphabetized – context:

> This man – the sanitary inspector – took a moving picture, in very slow time, very slow technique, of what would be required of the ordinary household [...] in getting rid of standing water [so that mosquitoes cannot breed] – draining pools, picking up all empty tins and putting them away, and so forth. We showed this film to an audience and asked them what they had seen, and they said they had seen a chicken, a fowl, and we didn't know that there was a fowl in it: So we very carefully scanned the frames one by one for this fowl, and, sure enough, for about a second, a fowl went over the corner of the frame. Someone had frightened the fowl, and it had taken flight through the righthand, bottom segment of the frame. This was all that had been seen. The other things he [the sanitary inspector] had hoped they would pick up from the film they had not picked up at all, and they had picked up something which we didn't know was in the film until we inspected it minutely. (Wilson, 1983, p. 31, own addition)

This incident led Wilson to question his assumptions about the physiological process of seeing as well as his assumptions about film as a medium. He started to systematically research how his pre-alphabetized target audience in West Africa was looking at the film both from a physiological as well as a cultural perspective. From his insights, two points are of note. For one, he remarks on the physiological process of seeing:

> When presented with the picture, they began to inspect it, rather like the scanner of a television camera, and go over it very rapidly. Apparently, that is what the eye unaccustomed to the picture does – [it] scans the picture [...]. (ibid., p. 32, own addition).

For the other, Wilson summarizes his findings on cultural conventions to understand film as a medium:

> We found that the film is, as produced in the West, a very highly conventionalized piece of symbolism, although it looks very real. For instance, we found that if you were telling a story about two men to an African audience, and one had finished his business, and he went off the edge of the screen, they wanted to know what happened to him; they didn't accept that this was just the end of him and that he was of no more interest in the story. They wanted to know what happened to this fellow, and we had to write stories that way, putting in a lot of material that wasn't to us necessary. We had to follow him along the street until he took a natural turn – he mustn't walk off the side of the screen but must walk down the street and make a natural turn. It was quite understandable that he could disappear around the turn. The action had to follow a natural course of events; otherwise the audience wanted to know why this fellow went off the edge of the screen – where was he? Panning shots was very confusing because they didn't realize what was happening. They thought the houses were moving. (Wilson, 1983, p. 32)

Wilson's observations in the above quotes suggest that a pre-alphabetized audience processes the visual information of the film in much the same way as it would process visual information of their respective life worlds. While this is also physiologically true for alphabetized audiences – as has been shown by Yarbus (1967) in extensive experiments – there seems to be a fundamental difference in how meanings are being contextualized. Depending on what kind of meanings are assumed to lie in the visual material, Yarbus concludes, a person will look at complex objects – such as photos or scenes in a lifeworld – differently:

> The human eyes voluntarily and involuntarily fixate on those elements of an object which carry or may carry essential and useful information. The more information is contained in an element, the longer the eyes stay on it. The distribution of points of fixation on the object changes depending on the purpose of the observer, i. e., depending on the information which he must obtain, for different information can usually be obtained from different parts of an object. The order and duration of the fixations on elements of an object are determined by the thought process accompanying the analysis of the information obtained. Hence people who think differently also, to some extent, see differently. (Yarbus, 1967, p. 211)

For the pre-alphabetized people reported by Wilson the film seems to be like a 'window'. The world depicted in the film is assumed to follow the same

'natural' and everyday principles as the life world of the audience: fowl and people vanishing off screen are highly unusual incidents. They will therefore be remembered and remarked as reported by Wilson (1983, p. 31): "We saw a chicken [strangely disappearing]." (ibid., p. 31, own addition).

On the basis of Wilson's observations, Marshal McLuhan contrasts literate and non-literate audiences in a general use of the word and concludes that:

> Literacy gives people the power to focus a little way in front of an image so that we can take in the whole image or picture at a glance. Non-literate people have no such acquired habit and do not look at objects in our way. Rather they scan objects and images as we do the printed page, segment by segment. (McLuhan, 2011, p. 43)

While Wilson's and McLuhan's conclusions regarding differences in seeing between alphabetized and pre-alphabetized audiences can be clearly refuted with empirical data, such as Yarbus' eye-tracking experiments, Yarbus' findings point towards alphabetized audiences contextualizing the events on screen in the cultural conventions of the film medium and a narrative which can be 'read off' the film. Being able to take in relevant visual information "at a glance" (ibid.) seems to hold true for alphabetized as well as pre-alphabetized audiences and must be therefore considered culturally learned and culturally contextualized behaviour, i. e. considered as 'literate' in a semiotic sense, casting serious doubt on the equation of pre-alphabetization with pre-literacy. Once a certain cultural seeing-behaviour is acquired, these processes are habitualized and set in almost automatically once certain cues are presented. Armed with these preliminary, anthropological considerations on visual perception, it is now possible to examine processes of acquiring 'object literacy' in a semiotic sense.

3. Reconstruction of Becoming 'Object Literate'

While literacy is – broadly speaking – concerned with conventionalized sign systems and therefore part of the general scope of semiotics, object literacy in the sense of Leahy (1995) and Littleton (1995) is confined to cultural objects and semiotics within specific boundaries, as outlined by Eco (1976, p. 5 ff.). According to Eco, semiotics as a discipline has "natural boundaries" which are determined by the object and nature of its inquiry (ibid.). At the "lower threshold" (ibid., p. 19) of the discipline there are phenomena which arise out of certain stimuli, but which are not conventionalized in attributing meanings. Such phenomena are often idiosyncratic and "performative", in the sense of establishing meanings in the moment of their performance or execution (cf. Fischer-Lichte, 2013). Because of this, Eco isolates these phe-

nomena from semiotic inquiry, as "the point where semiotic phenomena arise from something non-semiotic, as a sort of 'missing link' between the universe of signals and the universe of signs." (ibid., 21). Eco formulates here a possible connection between anthropological *cum* physiological facts and cultural facts, which are interesting from a didactic perspective. These 'lower threshold' semiotic phenomena are conducive for analyzing children's processes of acquiring 'object literacy' due to the fact that they are often found in children's plays and games – here drawing on a distinction by Mead between individual "plays" and social "games" (1967, p. 150 f.).

Referring to the project *Bildung und Objekte: Historische Sachlernprozesse in schulbezogenen Sammlungen*, [Education and objects: historical general learning processes in school-related collections], such plays and games of children often arise from interacting with material objects. In the project, children have the opportunity to physically explore historical museum collection objects or their replicas. These interactions have been videographed and interpreted according to the Grounded Theory Methodology of Corbin and Strauss (2008). More specifically in the terms of Eco, the collection objects in the project provide non-semiotic stimuli for children to performatively create their own meanings as well as the frameworks and rules for individual play and social games. Such plays and games and their rules are not strictly defined by the objects' characteristics or their "affordances" (Norman, 1999) – i. e. material properties such as shapes, colours, textures or degrees of freedom of articulated objects, which would suggest a specific way of using or handling the object – but must be considered as a kind of co-creation in that the object or its properties stimulate activities. An empirical example from the project will illustrate this point.

Fig. 2 – Keidel, K., Wagner, B. & Zehbe, K.-C. (2023, May 31, 00:03:30 ff., image edited). *A child holds a cardboard pinhole camera while other children explore a historical collection object.* Leipzig University.

Fig. 3 – Keidel, K., Wagner, B. & Zehbe, K.-C. (2023, May 31, 00:03:30 ff., image edited). *A child looks at the matte screen of a pinhole camera while other children explore a historical collection object.* Leipzig University.

Fig. 4 – Keidel, K., Wagner, B. & Zehbe, K.-C. (2023, May 31, 00:03:30 ff., image edited). *A child performs the launch of a rocket by jerking the cardboard pinhole camera out of the horizontal while other children explore a historical collection object.* Leipzig University.

In the context of an activity station with a historical pinhole camera a child holds a functional replica made from cardboard (see Fig. 2). While other children explore the historical collection object, the child looks at the matte screen of the replica and apparently remembers the pinhole opening on the other side (see Fig. 3). Both openings are then apparently connected through the body of the box and combined with the oblong form of the object. The resulting axis is then probably extended beyond the object to an invisible target. In putting the box on the shoulder (see Fig. 4), the object is given the symbolic meaning of a 'bazooka' or a portable rocket launcher. This leads later to a short individual play sequence: by jerking the oblong box out of the horizontal, the kick-back from launching a rocket is performed while supporting the movements with an explosion sound. This play is shortly afterwards repeated and performed in front of another child and thus offered as an opportunity for a game in Mead's sense. However, a game does not ensue in this situation.

Summary and Conclusion

The sequence shows that children attribute and contextualize meanings at different levels. For objects, these attributions of meaning are often linked to material properties which function as "stimuli" (Eco, 1976, p. 19) for sparking children's activity. Since a rocket launcher usually is not part of the lifeworld of children, this sequence must be motivated by remembering rocket launchers in media. Drawing on the previously outlined processes in acquiring literacy, the 'rocket launcher' is created by identifying – discriminating – remembering and combining object properties: discovering both openings on the object, connecting the openings with an axis through the body of the object as well as extending this axis to a target beyond the object. The result of these operations is given the metaphorical meaning of a 'rocket launcher' which is enacted and contextualized in the concrete lifeworld as an opportunity for further social interactions in a game. As such, the sequence has to be regarded as competent and 'literate' in the lifeworld of the child.

From an educational perspective, this sequence leads to the conclusion that there is not one literacy, but different 'literacies' rooted in concrete life worlds, which need to be put into transgenerational contact and exchange with each other. Wilson's report on pre-alphabetized film audiences seems to support this claim of different 'literacies'. Understanding such 'literate' behavior both from the perspective of the operations involved as well as from the store of experiences which are drawn on and mobilized in terms of Piai et al. (2016) offers significant potential from a didactical perspective to transform every day, lifeworld 'literacies' into professional or scientific literacies in the terms of UNESCO (2024). Existing empirical evidence on interactions

with material objects (Wagner, 2021; König & Wagner, 2023) points in this direction. However, accepting the notion of different 'literacies' also necessitates the openness for the perspectives of children who may – and will – see things differently from adults. Things, which adults have unlearned to see in the process of becoming literate, i. e becoming blind to the individuality of things *vis à vis* becoming literate in the generic properties of things as a "token" of a certain "type" of objects in sense of Peirce (CP 4.537). Here lies significant potential for transgenerational, social dialogue.

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