Nadwa: Jurnal Pendidikan Islam (Islamic Education Journal)
Vol. 15, No. 2, November 2021
ISSN 1979-1739 (p), 2502-8057 (e)
DOI: 10.21580/nw.2021.15.2.9815

An Introduction to a Vygotskian Tradition: The Potential of Sociocultural Activity Theory for Studies into Cognitive Development in Islamic Education

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Article History:

Submitted:
28-11-2021

Accepted:
19-12-2021

Published:
31-12-2021

Abstract:

This paper presents the potential of sociocultural activity theory as a combined theoretical and analytical framework for cognitive-developmental research in Islamic education. The paper is divided into three main sections. The first section briefly explains Vygotsky's sociocultural theory, especially the concepts of mediation and the genetic method. The second section accounts for the related activity theory, that is, the second-generation activity theory, including the second-generation activity system model and its notion of contradiction. Drawing on a larger study into teacher cognition, the third section reports how sociocultural activity theory informed the study's methodology, especially data collection and analysis techniques. Finally, this paper concludes with implications for future Islamic educational researchers seeking to conduct cognitive-developmental studies in their settings.

Keywords: Vygotsky; sociocultural theory; activity theory; cognition; Islamic education

ISSN 1979-1739 (P) ; ISSN 2502-8057 (E).

Accredited by Ristekdikti based on Decree No. 51/E/KPT/2017
http://journal.walisongo.ac.id/index.php/nadwa

Introduction

The last three decades have witnessed a growing number of empirical studies using sociocultural theory (SCT) and activity theory (AT). These are two strands of theory, among others, originating from the works of L. S. Vygotsky and his collaborators, especially A. N. Leontiev. SCT and AT have been used across diverse areas of interest, including developmental work research,[1] human-computer interaction,[2] and education. In educational research, in particular, a Vygotskian perspective has been employed in different settings such as early childhood education,[3] ICT education,[4] language education,[5] and teacher education,[6] to mention a

[1]Yrjö Engeström, 'Developmental Studies of Work as a Testbench of Activity Theory: The Case of Primary Care Medical Practice', in *Understanding Practice: Perspectives on Activity and Context*, ed. Seth Chaiklin and Jean Lave (New York: Cambridge University Press, 1993), 64–103.

[2]Bonnie A. Nardi, *Context and Consciousness: Activity Theory and Human-Computer Interaction* (Cambridge: MIT Press, 1996).

[3]Ade Dwi Utami, Marilyn Fleer, and Liang Li, 'Shift in Teachers' Pedagogical Practices in Play-Based Programme in Indonesia', *International Journal of Early Years Education* 28, no. 4 (2020): 397–412, https://doi.org/10.1080/09669760.2020.1777846.

[4]Ilias Karasavvidis, 'Activity Theory as a Conceptual Framework for Understanding Teacher Approaches to Information and Communication Technologies', *Computers & Education* 53, no. 2 (2009): 436–44, https://doi.org/10.1016/j.compedu.2009.03.003.

[5]Dery T. Agustin, 'Indonesian EFL Teachers' English Langauge Ideologies and Classroom Practices: A Sociocultural Activity Theory Perspective' (Monash University, 2021), https://bridges.monash.edu/articles/thesis/Indonesian_EFL_teachers_English_language_ideologies_and_classroom_practices_A_sociocultural_activity_theory_perspective/14256479.; Russel Cross, 'Language Teaching as Sociocultural Activity: Rethinking Language Teacher Practice', *The Modern Language Journal* 94, no. 3 (2010): 434–52, https://doi.org/10.1111/j.1540-4781.2010.01058.x.

[6]William E Blanton, Erin Simmons, and Mark Warner, 'The Fifth Dimension: Application of Cultural-Historical Activity Theory, Inquiry-Based Learning, Computers, and Telecommunications to Change Prospective Teachers' Preconceptions', *Journal of Educational Computing Research* 24, no. 4 (2001): 435–63, https://doi.org/10.2190/ygj0-wxuw-d0tr-9bgu; Thi Kim Anh Dang, 'Exploring

few. Based on my own experience of using Vygotsky's theory for studying teacher cognition (i.e., teachers' beliefs and practices) in English language education, I believe that the theory has potential for use in cognitive developmental research in the field of Islamic education.

This paper reports the theoretical framework that Agustin[7] used, SCT[8] and AT,[9] as a combined theoretical framework called sociocultural activity theory or SAT to unfold the potential. A study examining the interrelationship between teachers' beliefs and their classroom practices. Accordingly, it is essential to note that the discussion here is restricted to how SAT informs research, not pedagogy. To elaborate, the paper is organized into three major sections. The first section explains SCT and its two main concepts: the *genetic method* and *mediation*. The second section provides an account of AT 2.0 (the second-generation activity theory), including its *second-generation human activity system model* and its notion of *contradiction*. The second- rather than the third-generation activity theory is selected for this paper. Finally, the third section

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Contextual Factors Shaping Teacher Collaborative Learning in a Paired-Placement', *Teaching and Teacher Education* 67 (2017): 316–29, https://doi.org/10.1016/j.tate.2017.06.008.

[7]Agustin, 'Indonesian EFL Teachers' English Langauge Ideologies and Classroom Practices: A Sociocultural Activity Theory Perspective'.

[8]Lev S. Vygotsky, *Mind in Society: The Development of Higher Psychological Processes* (Cambridge: Harvard University Press, 1978); Lev S. Vygotsky, 'The Instrumental Method in Psychology', in *The Concept of Activity in Soviet Psychology*, ed. James V. Wertsch (Armonk, NY: M. E. Sharpe, 1981), 134–43; Lev S. Vygotsky, 'The Genesis of Higher Mental Functions', in *The Concept of Activity in Soviet Psychology*, ed. James V. Wertsch (Armonk: M.E. Sharpe, Inc., 1981), 144–87; Lev S. Vygotsky, 'The History of the Development of Higher Mental Functions', in *The Collected Works of L. S. Vygotsky*, ed. Robert W. Rieber (Boston, MA: Springer, 1997).

[9]Engeström, 'Developmental Studies of Work as a Testbench of Activity Theory: The Case of Primary Care Medical Practice'; Yrjö Engeström, 'Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization', *Journal of Education and Work* 14, no. 1 (2001): 133–56, https://doi.org/10.1080/13639080020028747.

briefly explains how Agustin[10] used the theory to inform his study's methodology. While the first and second sections lay the groundwork for understanding a Vygotskian approach, the third one provides an idea of how sociocultural activity theory may inform future Islamic educational researchers seeking to conduct cognitive-developmental studies.

Method

This study represents an effort to respond to rising interest in sociocultural theory in a broader field of study, including Islamic education. Informed by this context, this study presents an international systematic literature review of a limited scholarship body that positions sociocultural theory as a fundamental and potential component to advance scholarly works of Islamic education. Guiding by the current discourse of sociocultural theory and recent cognitive studies in Islamic education, this study attempts to seek out the potential ways to employ sociocultural theory in Islamic education. The following sections provide the foundational underpinning of sociocultural theory and followed by a detailed description and potential use of the theory in Islamic education.

Sociocultural Theory

In terms of the subject matter, sociocultural theory focuses on the development of *higher mental functions*,[11] also referred to as *cognition*.[12] Lantolf (in Throne, 2005) states that '*despite the label "sociocultural" the theory is not a theory of the social or of the cultural aspects of human existence... Rather, it is a*

[10]Agustin, "Indonesian EFL Teachers'."

[11]Vygotsky, 'The History of the Development of Higher Mental Functions'.

[12]Karen E Johnson and Paula R Golombek, 'Mindful L2 Teacher Education' (Routledge, 2016), https://doi.org/10.4324/9781315641447; Jaan Valsiner and René van der Veer, 'On the Social Nature of Human Cognition: An Analysis of the Shared Intellectual Roots of George Herbert Mead and Lev Vygotsky', in *An Introduction to Vygotsky*, ed. Harry Daniels (London: Routledge, 2005), 79–98.

theory of mind that recognizes the central role that social relationships and culturally constructed artifacts play in organizing uniquely human forms of thinking.'[13] Wertsch[14] identifies three central tenets of SCT: (1) social origin of higher mental functioning, (2) mediation by tools and signs, and (3) the use of genetic (i.e., developmental) method of analysis. Since the first tenet is closely intertwined with the second and the third one, discussions on the social genesis of cognition will be integrated into those of mediation and the genetic method.

Mediation

Central to SCT is the idea that "the human mind is *mediated*" (Lantof, 2000, 1, emphasis in original.) Mental functions are categorized into lower (i.e., naturally/biologically endowed) and higher (i.e., socially/culturally organized) functions. The former functions (e.g., instincts, reflexes) have characteristics similar to those of apes'[15] It is theorized that our lower mental functions respond directly to a stimulus. In this case, our responses to a stimulus can be explained using a simple S → R (stimulus → response) formula.

The later functions originate from social life. Emphasizing the social genesis of all forms of higher mental functions, Vygotsky (1997) points out that "*every function in the cultural development of the child appears on the stage twice, in two planes, first, the social, then the psychological, first between people as an intermental category, then within the child as an intramental category. This pertains equally to voluntary attention, to logical memory, to*

[13]S. L. Thorne, 'Epistemology, Politics, and Ethics in Sociocultural Theory', *The Modern Language Journal* 89, no. 3 (2005): 393.

[14]James V Wertsch, *Voices of the Mind* (Harvard University Press, 1993), https://doi.org/10.2307/j.ctv1pncrnd.

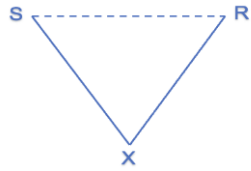
[15]Michael Cole and Yrjö Engeström, 'A Cultural-Historical Approach to Distributed Cognition', in *Distributed Cognitions: Psychological and Educational Considerations*, ed. Gavriel Salomon (Cambridge: Cambridge University Press, 1993), 1–46.

the formation of concepts, and to the development of will".[16]

Higher mental function develop through mediation by social relations[17] and cultural artefacts.[18] Unlike the lower functions, the development of higher mental functions (e.g., voluntary attention, logical memory) can only be explained using a model of mediated act (Figure 1). Figure 1 shows that humans make use of X (artificial means, e.g., cultural artefacts) in mediating their R (responses) to S (stimuli).

As stated earlier, human cognition and action are mediated by social relations and cultural artefacts. While mediation by *social relations* refers to *mediation by human* or *human mediation*, see, e.g., Johnson;[19] Kozulin;[20] Rogoff[21] for further elaboration, mediation by *cultural artefacts* refers to mediation by what Vygotsky[22] refers to as *tools* and *signs*. While tools represent *physical artefacts* (or material objects[23]), the notion of sign is used for psychological artefacts (also called *psychological tools*), especially *semiotic artefacts*.

Figure 1.
Vygotsky's model of mediated act[24]



[16]Vygotsky, 'The History of the Development of Higher Mental Functions'.

[17]Karen E. Johnson, *Second Language Teacher Education: A Sociocultural Perspective* (New York: Routledge, 2009).

[18]Cole and Engeström, 'A Cultural-Historical Approach to Distributed Cognition'.

[19]Johnson and Golombek, 'Mindful L2 Teacher Education'.

[20]Alex Kozulin, 'Psychological Tools and Mediated Learning', *Vygotsky's Educational Theory in Cultural Context* (Cambridge University Press, 2003), https://doi.org/10.1017/cbo9780511840975.003.

[21]Barbara Rogoff, 'Observing Sociocultural Activity on Three Planes: Participatory Appropriation, Guided Participation, and Apprenticeship', *Sociocultural Studies of Mind* (Cambridge University Press, 1995), https://doi.org/10.1017/cbo9781139174299.008.

[22]Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*.

[23]James P. Lantolf and Steven L. Thorne, *Sociocultural Theory and the Genesis of Second Language Development* (Oxford: Oxford University Press, 2006).

[24]Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*, 40.

Semiotic artefacts include "language; various systems for counting; mnemonic techniques; algebraic symbol systems; works of art; writing; schemes, diagrams, maps, and mechanical drawings; all sorts of conventional signs; etc."[25] In the process of mediation, language is considered to play an essential role and is thus mentioned as the "tool of tools."[26] To gain a proper understanding of how forms of mediation shape an individual's cognitive development, we need to conduct a genetic method of analysis.

Genetic method

Considering the social origin and the mediated nature of human cognition, Vygotsky (1978), citing P. P. Blonsky, adopts the notion that "behavior can be understood only as the history of behavior." In other words, an individual's cognition and action must be analyzed on the basis of their history or genesis.[27] To examine an individual's cognition historically or genetically means to examine it "*in the process of change*."[28] Vygotsky[29], therefore, emphasizes the need to focus on the *process* rather than on the *product* (e.g., on how individuals come to believe in what they believe instead of on what they currently believe).

Following Lewin, Vygotsky points out the significance of using a genotypic (as opposed to a phenotypic) approach.[30] "*By a developmental study of a problem, I mean the disclosure of its genesis, its causal dynamic basis. By phenotypic I mean the analysis that begins directly with an object's current features and*

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[25]Vygotsky, Instrumental Method," 137.

[26]Cole and Engeström, 'A Cultural-Historical Approach to Distributed Cognition', 6.

[27]Cross, 'Language Teaching as Sociocultural Activity: Rethinking Language Teacher Practice'.

[28]Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*, 65.

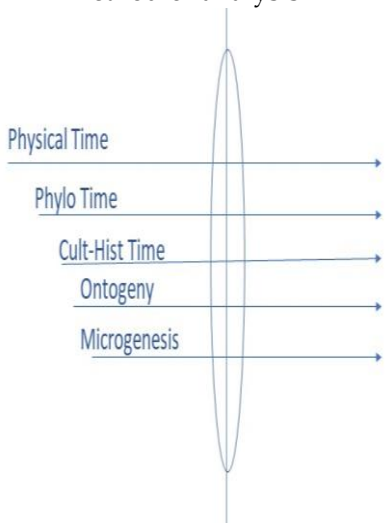
[29]Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*.

[30]Agustin, 'Indonesian EFL Teachers' English Langauge Ideologies and Classroom Practices: A Sociocultural Activity Theory Perspective'.

manifestations."[31] Take, for example, an analysis of whales. A genotypic analysis of whales reveals that whales *are* mammals. Looking at whales phenotypically, however, one may think that they are fish. In terms of psychological research, Vygotsky believes that *"without genetic analysis one can only describe certain aspects of psychological phenomena and cannot understand inner workings and causal dynamics."*[32]

Vygotsky[33] argues that investigating human cognition genetically means investigating four different but interrelated domains across which human development spans. They are *phylogenesis* (the evolution of humans or Homo sapiens as a species), *culturogenesis* (the development of human culture across generations, including the ideological and political context of human activity), *ontogenesis* (an individual's development during his/her lifespan), and *microgenesis* (an individual's development within an immediate event).[34] Figure 2 depicts domains of genetic analysis in relation to physical time.

Figure 2
The domains of the genetic method of analysis[35]



In terms of the interrelationship between culturogenetic and ontogenetic domain,

[31]Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*, 62.

[32]James V Wertsch, *Vygotsky and the Social Formation of Mind* (Cambridge, MA: Harvard University Press, 1985), 18.

[33]Lev S. Vygotsky, 'The Genesis of Higher Mental Functions'.

[34]Cole and Engeström, 'A Cultural-Historical Approach to Distributed Cognition'.

[35]Cole and Engeström, 20.

Vygotsky[36] emphasizes the primacy of the macro-social context in shaping an individual's cognitive development. Talking about the interconnection between ontogenetic and microgenetic domains, during our ontogenesis, we are technically living our lives across microgenetic events, moving from a microgenetic setting to another. Every time we enter a new microgenetic event, we bring our experience from the previous events into that very new event. The reverse holds true. A series of microgenetic events that we experienced make our own ontogenetic trajectory. Thus, ontogenesis is referred to as "the culmination of microgenetic development."[37] What we do in the microgenetic level can be analyzed using *activity theory*.

Activity theory: Second-generation activity theory

The activity theory presented here is Engestrom's[38] account of Vygotsky's and Leontiev's[39] works. Engestorm[40] reformulates Vygotsky's model of mediated act (Figure 1) into what he refers to as the first-generation activity system model (Figure 3.a). This model, however, is regarded as individually focused since it does not depict the role of context in shaping an individual's action. Drawing on Leontiev's[41] elaboration on the distinction between an individual's action and a collective activity, Engeström[42] graphically depicts a second-generation

[36]Vygotsky, *Mind in Society: The Development of Higher Psychological Processes*.

[37]Cross, 'Language Teaching as Sociocultural Activity: Rethinking Language Teacher Practice', 439.

[38]Engeström, 'Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization'.

[39]Aleksei N. Leontiev, *Problems of the Development of the Mind* (Moscow: Progress, 1981).

[40]Engeström, 'Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization'.

[41]Aleksei N. Leontiev, *Problems of the Development of the Mind*.

[42]Engeström, 'Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization'.

activity system model (Figure 3.b).

Figure 3.
(a) first-generation activity system model and (b) second-generation activity system model[43]

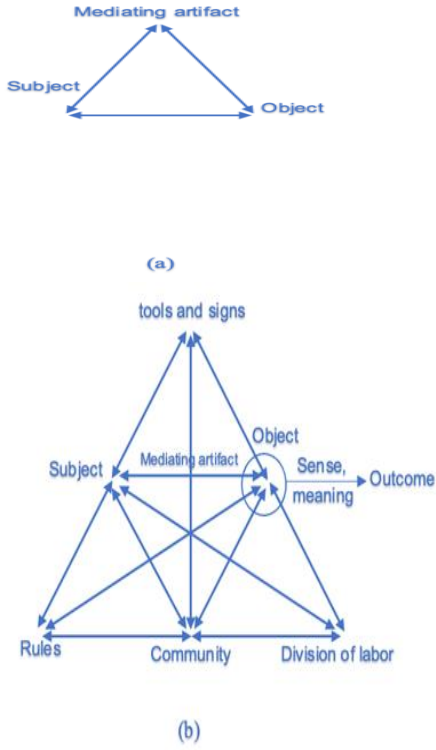


Figure 3.b shows that in the second-generation activity system model, an individual's action (represented by the triad of *subject*, *object*, and *mediating artifact*) is now put in socio-historical settings (*rule*, *community*, and *division of labor*). While *subject* refers to an individual (or a group of individuals)[44] with agency,[45] *object* is the individual's (or the group's) orientation[46] or purpose[47] of activity. With the help of *tools and signs* (*mediating artifacts*), the *object* is transformed into an *outcome*. As stated earlier, an individual action takes place in socio-historical settings, which involve *rules*, *community*, and *division of labor*. *Rules* include any regulation constraining or liberating the *subject*'s action. *Community* refers to people sharing the same

[43]Engeström, 134–35.

[44]Engeström, 'Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization'.

[45]Wolff-Michael Roth and Kenneth Tobin, 'Redesigning an "Urban" Teacher Education Program: An Activity Theory Perspective', *Mind, Culture, and Activity* 9, no. 2 (2002): 108–31, https://doi.org/10.1207/s15327884mca0902_03.

[46]Thi Kim Anh Dang, 'Identity in Activity: Examining Teacher Professional Identity Formation in the Paired-Placement of Student Teachers', *Teaching and Teacher Education* 30 (2013): 47–59, https://doi.org/10.1016/j.tate.2012.10.006.

[47]David Bakhurst, 'Reflections on Activity Theory', *Educational Review* 61, no. 2 (2009): 197–210, https://doi.org/10.1080/00131910902846916.

general *object*.[48] *Division of labor* represents working and power relationships among the people who identify themselves as part of the *community*[49] in achieving the general *object* of their activity.

This second-generation activity system model comprising the above-mentioned components/elements is suitable for researchers who "chose not to take an interventionist position, but instead used activity systems analysis as an analytical tool for understanding complex human learning situations that can be observed in natural settings."[50] In using the second-generation activity theory, researchers need to consider three principles.[51] First, the activity system must be taken as the unit of analysis. Second, the activity system must be understood historically or genetically (in the sense explained in the previous section, **Genetic method**). The third principle is the notion of contradictions as catalysts for change and development.[52] What Engeström[53] means by contradictions *are not* problems nor conflict. Rather, they are "structurally accumulating tensions within and between activity system" Further, Engeström[54] explains four levels of contradiction, namely, primary, secondary, tertiary, and quaternary

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[48]Harry Daniels, 'Activity Theory, Discourse and Bernstein', *Educational Review* 56, no. 2 (2004): 121–32, https://doi.org/10.1080/0031910410001693218.

[49]Cole and Engeström, 'A Cultural-Historical Approach to Distributed Cognition'.

[50]Lisa C Yamagata-Lynch, *Activity Systems Analysis Methods* (Boston, MA: Springer US, 2010), 23, https://doi.org/10.1007/978-1-4419-6321-5.

[51]Engeström, 'Developmental Studies of Work as a Testbench of Activity Theory: The Case of Primary Care Medical Practice'.

[52]Engeström, 'Expansive Learning at Work: Toward an Activity Theoretical Reconceptualization'.

[53]Engeström, 137.

[54]Yrjö Engeström, 'Learning by Expanding: Origins, Applications, and Challenges', in *Learning by Expanding* (Cambridge: Cambridge University Press, n.d.), xiii–xxxviii, https://doi.org/10.1017/CBO9781139814744.002.

contradictions. How sociocultural activity theory may inform research on cognitive development is illustrated below.

The Application of SAT to research into teacher cognition

As stated earlier, this paper is based on a study conducted by Agustin.[55] This section presents how Agustin[56] viewed the phenomenon under investigation (i.e., teachers' beliefs and classroom practices) from a sociocultural activity theory (SAT) perspective and how the theory informed the research methodology, including the techniques of data collection and analysis. References to other relevant studies are included as necessary.

The study

Agustin[57] investigated the interrelationship between English language teachers' beliefs about English (including English language teaching or ELT) and their classroom practices. His study sought to identify (1) the development of the teachers' beliefs and (2) the impacts of such beliefs on their pedagogical practices. The study was a multiple case study involving four English language teachers working at secondary schools in Indonesia (See Cresswell[58] for a definition of a multiple case study). Each teacher was viewed as a case.

Viewing teachers' beliefs and practices from a SAT perspective

Informed by sociocultural theory (SCT), Agustin[59] viewed teachers' beliefs as genetically social and mediated by cultural artifacts. Understanding the development of teachers' beliefs thus requires understanding forms of

[55] Agustin, 'Indonesian EFL Teachers' English Langauge Ideologies and Classroom Practices: A Sociocultural Activity Theory Perspective'.

[56] Agustin.

[57] Agustin.

[58] J.W. Creswell and J. David Creswell, *Research Designs: Qualitative, Quantitative, and Mixed Methods*, 5th ed. (Los Angeles: SAGE Publication, Inc., 2018), https://doi.org/10.1891/9780826146373.0007.

[59] Agustin, "Indonesian EFL Teachers'."

mediation experienced by the teachers, including the teachers' social relationships and the cultural artifacts involved. In other words, it is crucial to identify factors that play a role in shaping and reshaping teachers' beliefs from the earlier stages to date. Then, to disclose the nature of teachers' current beliefs and to produce a comprehensive account of their developmental process, the genetic method was used. This means viewing the teachers' current beliefs in relation to the genetic domains mentioned above, especially the culturogenetic, ontogenetic, and microgenetic domain.

In terms of the teachers' classroom practices, Agustin[60] viewed a teacher's classroom practice as an activity situated in context. In activity theory (AT), contexts are activity systems.[61] As previously motioned, an activity system is comprised of components/elements (i.e., *subject*, *object*, *mediating artifacts*, *rules*, *community*, and *division of labor*). Understanding a teacher's activity thus requires understanding the interrelationships between the teacher and all the components/elements within his/her activity system. Using AT as the lens, the case is no longer the teacher but the teacher's activity system as a bounded system (see Yamagata-Lynch[62] for an elaboration of an activity system as a bounded system and thus a case).

How SAT informed data collection

In Agustin,[63] data collection was informed by the genetic method. Using the genetic method for investigating an individual's cognition (e.g., beliefs & practices) means collecting culturogenetic, ontogenetic, and microgenetic data. For

[60] Agustin, 'Indonesian EFL Teachers' English Langauge Ideologies and Classroom Practices: A Sociocultural Activity Theory Perspective'.

[61] Engeström, 'Developmental Studies of Work as a Testbench of Activity Theory: The Case of Primary Care Medical Practice', 67.

[62] Yamagata-Lynch, *Activity Systems Analysis Methods*.

[63] Agustin, 'Indonesian EFL Teachers' English Langauge Ideologies and Classroom Practices: A Sociocultural Activity Theory Perspective'.

each data set that he aimed to collect, Agustin[64] determined (1) suitable technique(s) for collecting the intended data and (2) the focus/foci of data collection and analysis. For example, to obtain ontogenetic data of a teacher, he[65] employed a pre-observation interview that focused on the teacher's personal background, learning experience, teaching experience, present beliefs about English and ELT, past beliefs about English, and ELT, perceived sources of such beliefs, and so on. Another example includes making use of classroom observations for collecting microgenetic data. This observation focused on instructional aspects within the classroom, such as interactions between the teacher and the students and the pedagogical tools used by the teacher. Additionally, Agustin[66] collected relevant artifacts (i.e., documents), shedding light on the national context of ELT in Indonesia.

Of course, the interview, the observation, and collection of artifacts mentioned above were not the only data collection techniques used. Other techniques were utilized in accordance with the purpose of the study. Interactions between the teacher and the students, as well as the pedagogical tools used by the teacher, were not the only foci of the classroom observation. Other foci were also mentioned. However, for the purpose of this paper I believe that the examples given above adequately illustrate the idea of how the genetic method may inform data collection. See Table 1 for an illustration of a way of linking data collection techniques, the genetic domain, and the foci of data collection and analysis. Similar tables can be found in studies conducted by other scholars including Barahona,[67] Cross,[68] and Dang.[69]

[64] Agustin.
[65] Agustin.
[66] Agustin.

[67] Malba Barahona, *English Language Teacher Education in Chile* (Routledge, 2015), https://doi.org/10.4324/9781315689937.

Table 1.
Data collection techniques, genetic domains, and foci of data collection

Data collection techniques	Genetic domain	Foci of data collection and analysis
Collection of artifacts (i.e., documents)	Culturogenetic	The national context of Indonesian ELT
Pre-observation interview	Ontogenetic	Personal background
		Learning experience
		Teaching experience
	Microgenetic/ Ontogenetic	Current beliefs about English and ELT
	Ontogenetic	Past beliefs about English and ELT
		Perceived sources of the teacher's beliefs
Classroom observation	Microgenetic	Interactions between the teacher and the students
		The pedagogical tools used

How SAT informed data analysis

To analyze the data, Agustin (2021) used an *genetic and activity system analysis."* It is, as its name suggests, a combination of a genetic analysis and an activity system analysis.

[68]Cross, 'Language Teaching as Sociocultural Activity: Rethinking Language Teacher Practice'.

[69]Dang, 'Exploring Contextual Factors Shaping Teacher Collaborative Learning in a Paired-Placement'.

This analytical framework was an adaptation of Dang's (2017) "*combined genetic and joint-activity system analysis.*" Using this framework, data analysis was divided into three levels: level 1, level 2, and level 3.

Level 1 was a genetic domain analysis. Here, all the data obtained from each teacher were sorted and then categorized into three data sets, that is, microgenetic, ontogenetic, and culturogenetic data. Level 2 was an activity system analysis, that is, a within-case analysis or an analysis of each case. Here Agustin[70] began with analyzing each lesson carried out by a teacher. At this stage, the objective was to identify all the components involved in each lesson. To analyze the first lesson, for example, all the microgenetic data obtained from that lesson were coded into *subject*, *object*, *mediating artifacts*, *rules*, *community*, or *division of labor*. Analyses of the second and the third lesson followed the same procedure. After analyzing all the lessons, the next task was doing analysis across lessons carried out by the same teacher. This was intended to see if and how the teacher's activity system changed over time, if there were any contradictions that occurred, and, if any, whether and how such contradictions drove any change in the teacher's activity system. Level 3 was another activity system analysis, that is, a cross-case analysis. A cross-case analysis was carried out because the study involved four cases. The purpose of this analysis was to identify further issues not visible in within-case analysis such as general patterns, similarities, and differences among the cases. The last section of this paper presents the conclusion and implications for future Islamic educational researchers seeking to conduct cognitive-developmental studies.

Conclusion

In terms of viewing the phenomenon under investigation (i.e., cognition), researchers need to hold the idea that cognition originates from social life, develops through mediation by social relations and cultural artifacts, and can only be understood historically by means of a

[70] Agustin, 'Indonesian EFL Teachers' English Langauge Ideologies and Classroom Practices: A Sociocultural Activity Theory Perspective'.

genetic (or developmental) analysis. In conducting a genetic analysis, researchers need to focus on the *process* rather than the *product* (e.g., on how individuals came to believe in what they believe rather than on what they currently believe). Only by examining the developmental process can researchers disclose the nature of the individuals' cognition including the underlying forces. Regarding practice, an individual's practice must be viewed as situated in context. An individual's practice must be conceptualized as a sociocultural activity comprised of several interrelated and inseparable elements, namely, *subject*, *object*, *mediating artefacts*, *rules*, *community*, or *division of labor.*

As stated above, to obtain a proper understanding of an individual's cognitive development, researchers need to employ a genetic method. In terms of data collection, researchers must collect data associated with each genetic domain (usually culturogenetic, ontogenetic, and microgenetic domain). The techniques of data collection may be different from those mentioned above depending on the purpose of the study. Additionally, researchers need to define the foci of data collection using the preferred techniques. Regarding data analysis, a combination of genetic analysis and activity system analysis can be an option especially when researchers not only investigate individuals' cognitive development over time but also the manifestation of their cognition in the form of action within a given situation. By conducting an activity system analysis, not only can a researcher reveal how an individual's cognition shapes his or her activity but also how contradictions occurring within the activity drive a change in the individual's cognition.

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