

**2018 Master's Thesis**

# **A Systematic Mapping Study on SEMAT and Its Methods**

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# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Background</b>	<b>3</b>
2.1	SEMAT . . . . .	3
2.2	SEMAT Essence . . . . .	3
2.2.1	SEMAT Essence Kernel . . . . .	4
2.2.2	SEMAT Essence Language . . . . .	6
<b>3</b>	<b>Research Method and Conduct</b>	<b>7</b>
3.1	Search Strategy . . . . .	7
3.2	Exclusion Criteria and Selection Process . . . . .	8
3.3	Data Extraction and Synthesis . . . . .	8
<b>4</b>	<b>Results</b>	<b>11</b>
4.1	Number of studies by year . . . . .	11
4.2	Categories of the included studies . . . . .	12
4.3	Distribution of common ground and new views . . . . .	13
4.4	How do studies use SEMAT Essence? . . . . .	14
4.5	Which parts of SEMAT Essence are used in studies? . . . . .	15
4.6	What is the proportion of general categories in each detailed category? . . . . .	16
<b>5</b>	<b>Discussion</b>	<b>18</b>
5.1	Answers for RQ1: What types of research can be classified as research on SEMAT and its methods? . . . . .	18
5.2	Answers for RQ2: What parts of SEMAT Essence are used in previous research? . . . . .	19

5.3	Answers for RQ3: What inspiration can be obtained based on the classification results? . . . . .	20
5.4	Limitations . . . . .	20
<b>6</b>	<b>Conclusion and Future Work</b>	<b>22</b>
	<b>Acknowledgments</b>	<b>23</b>
	<b>Appendix</b>	<b>24</b>

# Chapter 1

## Introduction

Although progress has been made in Software Engineering over the last 50 years, basic theories are lacking. Presently, generally accepted criteria and concepts remain debatable [1]. To solve this problem, the Software Engineering Method And Theory (SEMAT) community was founded by Ivar Jacobson, Bertrand Meyer, and Richard Soley in 2009. In its first year, this community promoted an initiative to reestablish the basic theories of software engineering and propose a set of effective criteria and concepts [2]. In 2012 SEMAT submitted criteria, which are collectively named SEMAT Essence, to OMG (Object Management Group) as part of their initiative [2].

In the past decade, SEMAT has not only been improved continuously, but other researchers have also conducted research on SEMAT and its methods. SEMAT Essence has been continually evolving [3]. For example, SEMAT was initially submitted to OMG to audit in 2012, version 1.0 was released in 2014, and version 1.1 in 2015. According to our research, SEMAT Essence has been investigated in the fields of education, application, support to create new practices, etc. It can be said that SEMAT and its methods have received a lot of attention and support with respect to development in the past decade.

After we collated numerous papers related to SEMAT, we found that some problems remain. The most crucial problem is that this field has yet to be reviewed, analyzed, and classified. This problem results in future researchers ignoring existing problems in previous research, difficulty grasping the current situation of SEMAT, and issues identifying a direction for future work [4]. Especially, we think that grasping the current situation of SEMAT will play a very important role in future research. Therefore, to solve this problem, we divided it into three specific research questions.

- RQ1: What types of research can be classified as research on SEMAT and its methods?
- RQ2: What parts of SEMAT Essence are used in previous research?
- RQ3: What inspiration can be obtained based on the classification results?

RQ1 is used to explore what areas current researchers are studying and to identify common and unique points. RQ2 is used to explore which parts of SEMAT Essence are involved in current research. For example, are Essence Kernel or Essence Language studied in the same paper? If the paper is related to Essence Kernel, which parts (e.g., Alpha, State, Activity, and Activity Space) of Kernel are used? RQ3 is used to explore what new visions or ideas that can be obtained based on the classification results.

Herein SEMAT and its methods are classified and analyzed via a systematic mapping method. This research should be a guide for future researchers to grasp the current situation of SEMAT and provide a theoretical basis for problems in previous studies.

The remainder of the paper is structured as follows. Section 2 presents the background. Section 3 explains our research method. Section 4 shows the results of our systematic mapping of SEMAT and its methods. Section 5 discusses the results. Finally, Section 6 concludes the paper.

# Chapter 2

## Background

This chapter has two sections. The first introduces the SEMAT community and its initiatives. The second section describes the criteria of SEMAT Essence.

### 2.1 SEMAT

SEMAT (Software Engineering Method And Theory) was founded in September 2009. This community strives to fundamentally change how software is developed and to provide strong theoretical support for software engineering. To achieve these goals, this community has called for action; they used simple language to define crucial problems in the current software engineering field [5]. To date, this community has had two main goals: 1) Identify the essential elements accepted by most people during software development and 2) define a theoretical foundation for these elements.

### 2.2 SEMAT Essence

Since this community was founded in 2009, SEMAT spent three years identifying the essential elements of development [5], submitting the criteria of SEMAT Essence to OMG in 2012, releasing its first official version 1.0 in 2014, and releasing version 1.1 in 2015 [3]. Moreover, this community also conducted research to verify the effectiveness and applicability of SEMAT Essence [6]. SEMAT Essence can be divided into two parts: Essence Kernel and Essence Language. Essence Kernel is used to capture the most basic

elements of software development [7]. Essence Language is used to describe development methods, practices, and new Kernels [7].

### 2.2.1 SEMAT Essence Kernel

SEMAT Essence Kernel is used to define the most basic elements that all developments need as well as to provide a framework for thinking, which leads to a development team working well together. Moreover, it also helps developers understand the situation of the current project, what to do in the next step, and future optimizations [8]. Essence Kernel includes six parts: Alpha, State, Checklist, Activity, Activity Space, and Work Production.

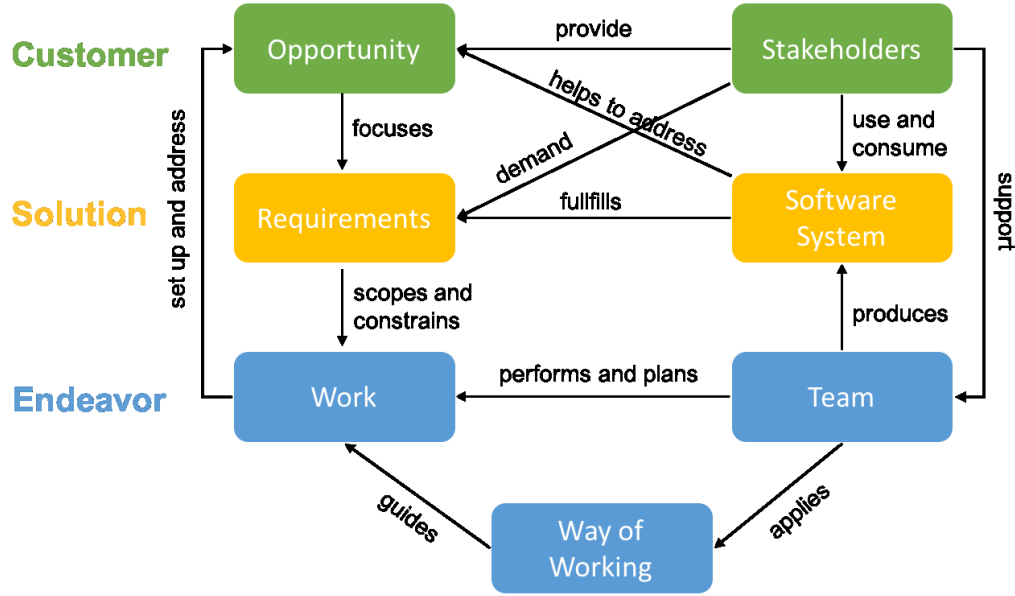


Figure 2.1: Kernel Alphas

As shown in Fig. 2.1, Essence Kernel includes seven alphas. Based on the concern, alphas are subdivided into three: Customer, Solution, and Endeavor. Each alpha is used to present the element focused on during the development and has several states (Fig. 2.2(a)), which represent the status of a project. For accurate measurements, each state also has a checklist, which includes quantitative criteria that must be achieved. For example, Fig.

2.2(b) shows all the check items that the state of Initiated under Work Alpha. A state is achieved once all the items in the checklist have been completed. Therefore, the state of Alpha in Essence Kernel can help a development team easily grasp the situation of their project in a specific field. The checklist can also help a team measure the current situation of the project and identify problems in the current step. General alphas can help a team intuitively understand the projects progress.

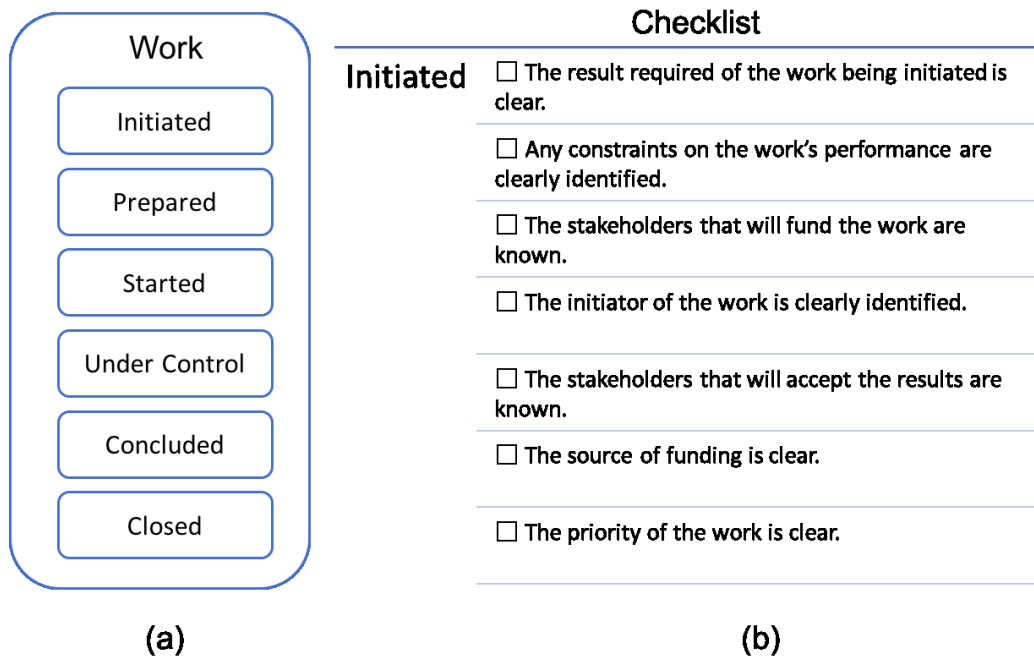


Figure 2.2: State of the Work Alpha and the checklist of the Initiated State

Essence Kernel also includes Activity Space, which is used to describe concrete activities and steps of development. Work Product is used to describe the results of works. Therefore, Essence Kernel can aid team in managing and monitoring projects effectively through all elements.



### 2.2.2 SEMAT Essence Language

SEMAT Essence Language uses a set of elements to define various relationships among concepts in Essence visually [7]. The elements in Essence Language are the same as the elements in Kernel: Alpha, Alpha State, Activity, Activity Space, Work Production, and Competency. Figure 2.3 presents a graph corresponding to each element and its relationships in Essence Kernel through Essence Language. In practice, developers can also use Essence Language to define new Kernel, State, and practices based on SEMAT Essence to satisfy their development requirements.

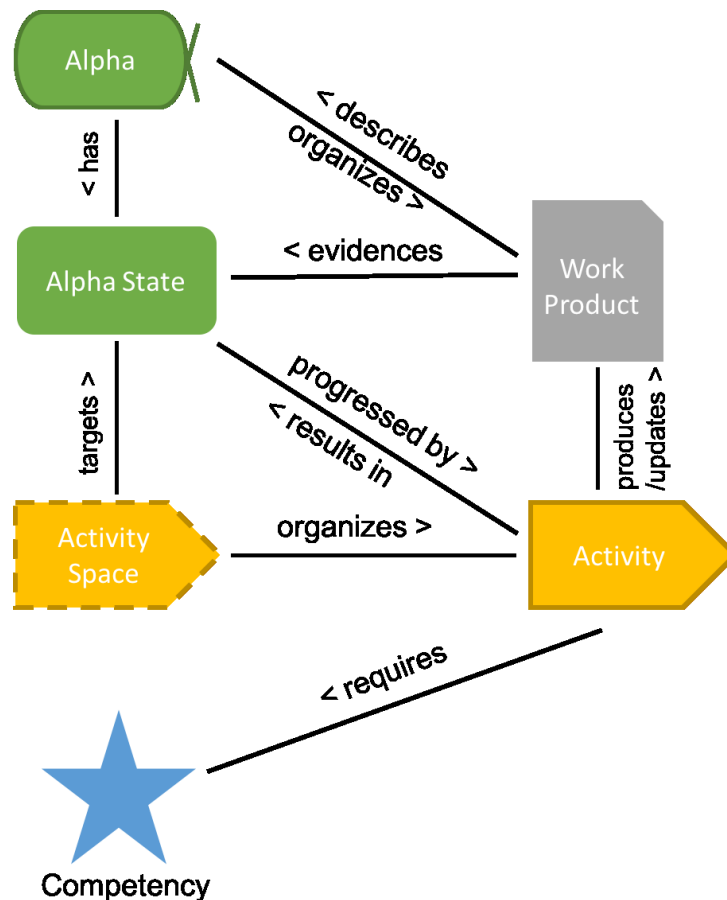


Figure 2.3: Relationships in Essence Kernel described by Essence Language

# Chapter 3

## Research Method and Conduct

As mentioned in Chapter 1, the main goal of this research is to grasp the current situation of SEMAT related research. We divided this goal into three research questions. To address these questions, we employed a mapping study method to classify and analyze SEMAT related research. This mapping study referred to Kai Petersen et al. [9] as a guideline. This chapter introduces the detailed design of our research method.

### 3.1 Search Strategy

This study employs Scopus as the main query database [10]. In addition, Google scholar, IEEE Xplore, and ACM are used as minor databases to find additional information about papers not available in Scopus.

For a search query string, first we decided the scope of research. Then we defined the search query string. Because this research focuses on the current situation, this mapping study limits the research scope to papers that study SEMAT Essence. According to our preliminary investigation, few studies are related to SEMAT because it is relatively new. The first paper that other researchers studied the SEMAT Essence was published in 2013. Because of the limited number of papers, we did not employ a complicated query string in the searches. We only used SEMAT as a keyword to search the title, abstract, and keywords. Based on this query, we only added a language filter to narrow the search for papers written in English. This search identified 71 related papers. Our query was:

*TITLE-ABS-KEY ( semat ) AND ( LIMIT-TO ( LANGUAGE , "English" ) )*

## 3.2 Exclusion Criteria and Selection Process

Before the selection process, we defined the exclusion criteria. As shown in Table 3.1, initially we removed papers unrelated to SEMAT and its methods. Especially, in other areas of research, the term SEMAT is used. Therefore, we removed papers that were not specifically related to Software Engineering Method And Theory. Next, we removed papers that were a conference review because these papers only summarized conferences. In addition, we removed the papers written about the creation of SEMAT as they simply introduce SEMAT concepts and do not present new ideas or perspectives. Finally, we removed repeat papers published as part of conferences.

Table 3.1: Exclusion criteria and inclusion criteria

Exclusion criteria	Inclusion criteria
a. Remove documents not associated with SEMAT (Software Engineering Method And Theory) or its methods.	a. Documents must be in the domain of SEMAT (Software Engineering Method And Theory) or its methods
b. Remove documents that are a conference review.	
c. Remove documents that only introduce SEMATs concepts and definitions.	
d. Remove repeated documents.	

Our selection process was conducted by the first and second authors. The whole process can be divided into two steps. First, we read the abstracts of all papers and conducted a preliminary screening based upon the selection criteria. As shown in Fig. 4, the first step eliminated 36 unrelated papers. We also classified the remaining papers into six categories. Then we read every paper by category. This removed eight additional papers as they were unrelated or did not satisfy the criteria. Eventually, we identified 27 papers.

## 3.3 Data Extraction and Synthesis

We extracted information through a data extraction form. The data extraction form, which is shown in the appendix, was used to record the research

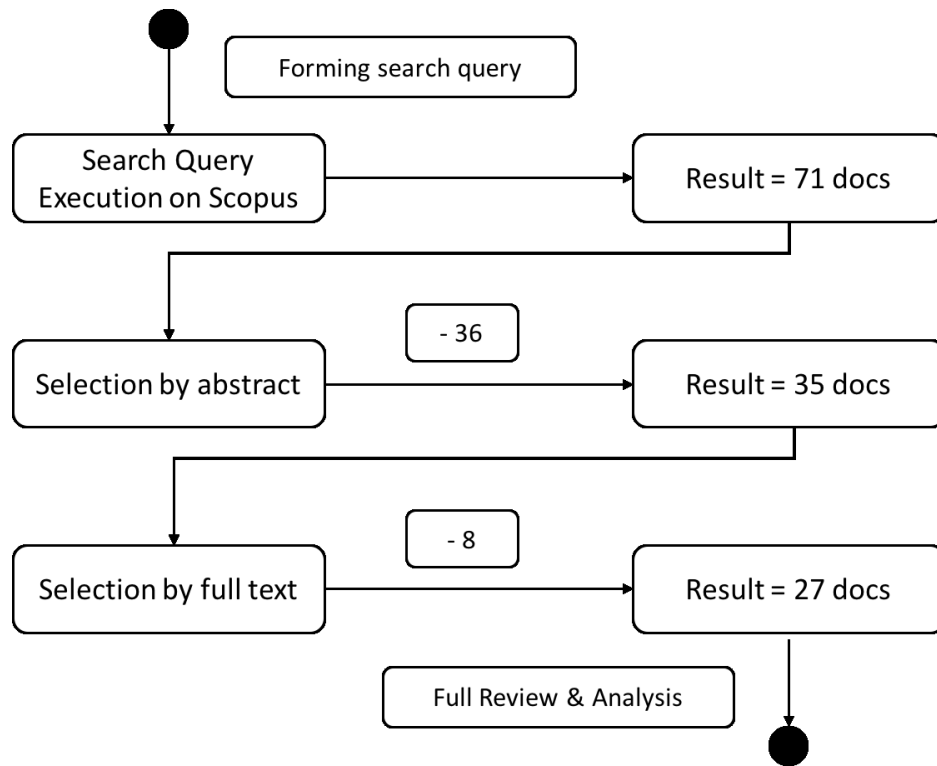


Figure 3.1: Paper selection process and the number of papers at each step

questions and the solutions by paper. Additionally, the form denoted the types of alphas (e.g., Opportunity, Stakeholder, Software Systems etc.) and which part of SEMAT Essence (Essence Kernel or Essence Language) is referenced. If Essence Kernel was used, which parts of Kernel were also recorded in the form. "Methods combined with SEMAT" and "How to combine" were used to record what methods are combined to support research in the paper. Finally, we recorded common points and non-common points that likely exist between the 27 papers.

Then the first and second author employed a mapping study to extract information. All the papers were simply classified into six categories during the first screening. Then each extractor read all the papers in one or two categories each week. The two extractors discussed each paper to confirm the results. To improve the accuracy and the amount of data extraction, this mapping study used cross checks, in which each paper was discussed from

multiple viewpoints as part of the extraction process.

# Chapter 4

## Results

This chapter shows the statistical results and introduces the concepts involved. The results are collected from 27 studies (Appendix Included Studies), which were screened using the process in Chapter 3. We used Microsoft Excel to perform statistical operations and to draw charts.

This chapter is divided into six sections. Each section uses a set of statistics to address the research questions. In detail, 4.1 performs statistics by year to find the relationships between the number of papers over time. 4.2 classifies the studies to grasp the general situation. 4.3–4.5 classify the studies by detailed categories such as features of SEMAT Essence, usages of SEMAT Essence, etc. to understand how researchers conduct their studies. 4.6 summarizes and integrates the results from 4.1–4.5.

### 4.1 Number of studies by year

Figure 4.1 shows the number of studies published by year. The first paper related to SEMAT was published in 2013. This is the first year after the SEMAT criteria were submitted for an OMG audit. Since peaking in 2014, the number of published papers has shown a downward trend. SEMAT Essence is still a new area. At the beginning, a lot of researchers were interested, but the passion for SEMAT research seems to be dwindling.

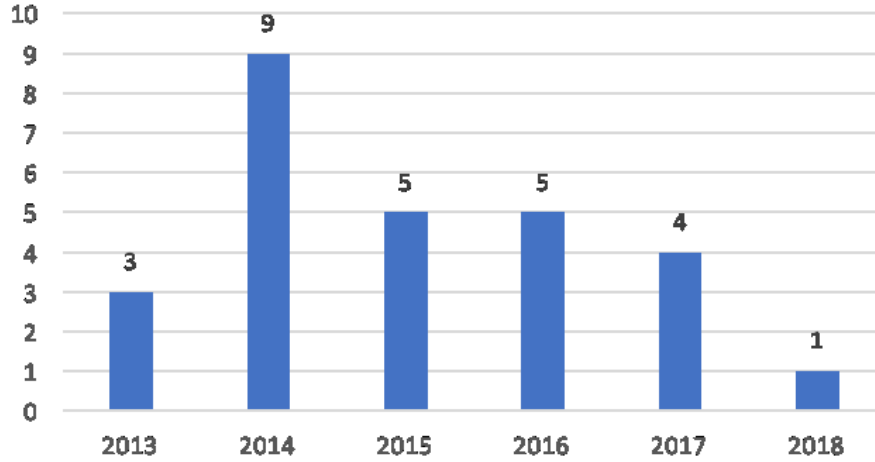


Figure 4.1: Number of studies by year

## 4.2 Categories of the included studies

Figure 4.2 illustrates the general categories of the included studies. We classified them into three categories as shown below:

- **Research:** A study that uses SEMAT Essence to propose new methods. In addition, if it study does not fit in education or practice, it falls into this category.
- **Practice:** A study mainly focused on conducting case study for a SEMAT Essence or other methods combined with SEMAT Essence.
- **Education:** A study focused on how to use SEMAT Essence or other methods of software engineering to improve education.

Over half (52%) fall into the research category. This suggests that using or extending SEMAT Essence to propose new method is very popular in current research. Practice and education together comprise 48% of the research. 18% education category indicates that SEMAT Essence cannot only guide a development, but can also play a role in teaching.

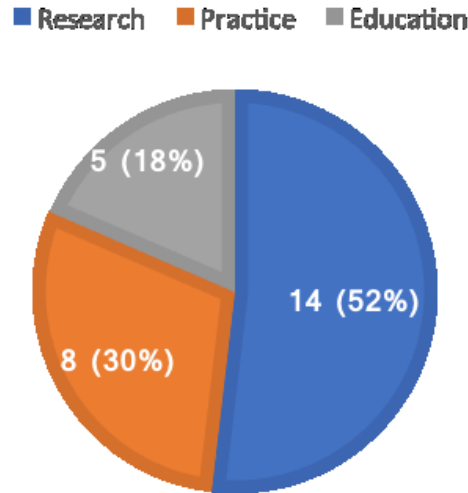


Figure 4.2: Distribution of general categories

### 4.3 Distribution of common ground and new views

This section shows the two crucial features of SEMAT Essence: to provide common ground and to provide new views. The former allows team members to find common ground to discuss problems and ensure that a development progresses smoothly. For example, as introduced in Chapter 2, SEMAT Essence Kernel has seven alphas, and each alpha has a list of states. Based on these elements, the team members can devise a unified background to address obstacles efficiently. The latter helps develop innovation and new views. For example, the checklist in SEMAT Essence Kernel includes check items, which can help teams prioritize points by importance.

We think these two features impact developments strongly. To understand how studies researched these two features, we separated them into two, depending on the main focus. Figure 4.3 shows that of the 27 studies, 17 focus on new views, while 7 focus on common ground. The remaining studies do not reference both of them. These results imply that more researchers focus on providing new views.



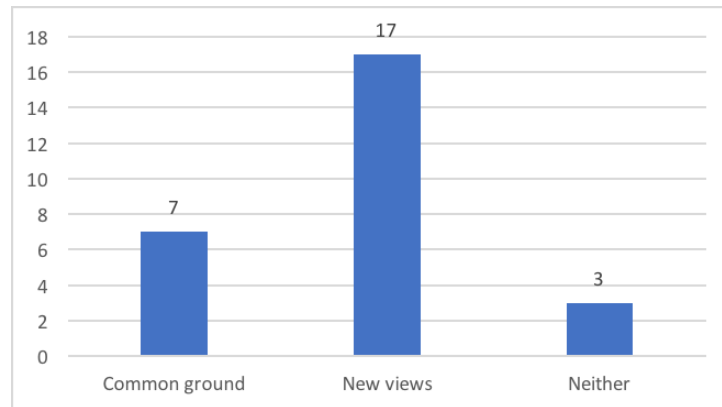


Figure 4.3: Distribution of papers discussing common ground and new views

## 4.4 How do studies use SEMAT Essence?

This section shows how SEMAT Essence are used in studies. The studies were divided into two types: those that use SEMAT Essence directly and those that do not. The former means that the study does not extend SEMAT Essence (e.g., no new alphas or concepts are added). The latter proposes new alphas or concepts.

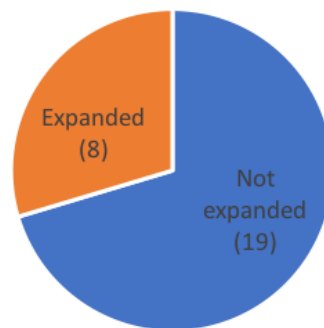


Figure 4.4: Ratio of papers with expand and non-expanded SEMAT Essence

Figure 4.4 presents the proportion of studies that expand and do not expand SEMAT Essence. Most studies did not expand SEMAT Essence, suggesting that researchers tend to focus on how to use the original SEMAT Essence to support existing research areas or how to combine SEMAT Essence with other methods to solve questions.

## 4.5 Which parts of SEMAT Essence are used in studies?

This section shows the analysis results of using SEMAT Essence from two aspects: general and detailed viewpoints. The former explores whether Kernel or Language in SEMAT Essence is used. The latter considers the frequency of each element.

Figure 4.5 shows the number of papers using Essence Kernel and Essence Language. Essence Kernel is much useful in common developments and practice. The sum of these two categories (31) exceeds the number of included studies (27), suggesting that some studies consider both.

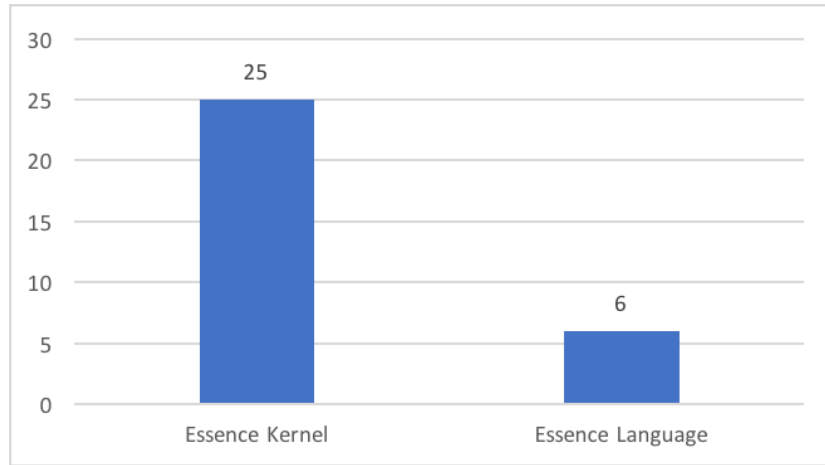


Figure 4.5: Number of papers with Essence Kernel and Essence Language

Figure 4.6 shows the use frequency of elements in Kernel. The top three are Alpha, State, and Checklist. Especially, Alpha and State are much higher than others, suggesting that most research focuses on these two elements.

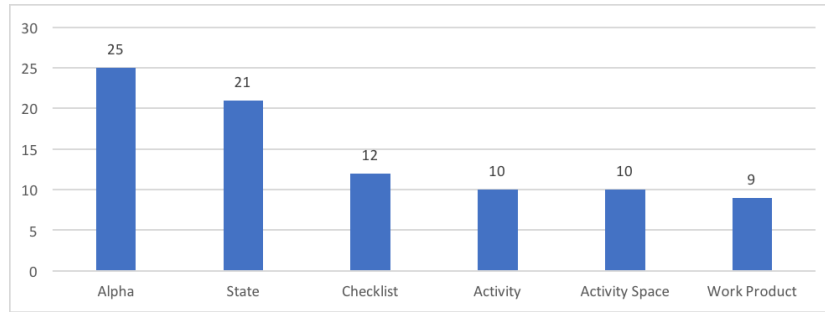


Figure 4.6: Use frequency of elements in Kernel

The lack of research on Activity, Activity Space, and Work Production suggests that these three elements have yet to be optimized.

## 4.6 What is the proportion of general categories in each detailed category?

We combined the results of the general categories (research, practice, and education) and the results of detailed categories to determine the composition of the detailed categories. Table 4.1 shows the results.

The first column is the items in each detailed category. The second to the fourth column are the number of papers corresponding to each general category. The last column shows the total numbers of papers.

Table 4.1: Distribution of the categories in the included studies

	Research	Practice	Education	Total
Giving common ground	5	1	1	7
Giving new views	9	1	2	12
Expanded	6	1	1	8
Not expanded	10	7	2	19
Essence Kernel	15	7	3	25
Essence Language	5	0	1	6
Alpha	15	8	3	26
State	12	6	3	21
Checklist	6	3	3	12
Activity	5	3	2	10
Activity Space	5	3	2	10
Work product	5	3	1	9

# Chapter 5

## Discussion

This chapter discusses and analyzes the statistical results in Chapter 4, combines detailed examples of included papers in the analysis, and answers the research questions proposed in Chapter 1. In detail, 5.1 combines the results from 4.2–4.4 answers of RQ1 from two aspects of general categories and detailed categories. 5.2 combines the results of 4.5 to answer RQ2. 5.3 answers RQ3 according to the discussion results of 5.1 and 5.2. Finally, in 5.4 we discuss some possible limitations in this research.

### **5.1 Answers for RQ1: What types of research can be classified as research on SEMAT and its methods?**

From the perspective of general research areas, current studies related to SEMAT can be divided into three aspects, which in descending order are research, practice, and education (Fig. 4.2). The number of papers related to research is almost same as the sum of those related to practice and education, which have similar numbers of papers. The papers related to research tend to combine SEMAT Essence to propose new methods or extend the original SEMAT Essence. For example, [25] proposed a framework that can guide PSS (Product-Service System) developments by referring to the structure of SEMAT Essence. [33] extended SEMAT Essence so that it can support multi-module developments. The papers related to practice tend to validate methods associated with SEMAT Essence via case studies. For example,

[31] validated the effectiveness of SEMAT Essence. [32] using a case study to assess the effectiveness of SEMAT Essence in reflection meetings. Finally, the papers related to education focus on how to apply SEMAT Essence in the area of education. For example, [12] integrated isolated knowledge of software engineering through SEMAT Essence, providing a systematic approach to learn software engineering from a general perspective for students.

For the detailed classification (Fig. 4.3), the papers can be divided into two based on whether they provide common ground or new views. For example, [13] rebuilt the Organization-based Multi-agent System Engineering (O-MaSE) method by feature providing a common ground to make it easier to understand. [26] gave new viewpoints through methods in SEMAT Essence to make developers concern of human errors easier to prioritize during developments. Additionally, papers on using SEMAT Essence can be subdivided into those directly using it and those extending it (Fig. 4.4). For example, [19] extends each Alpha in SEMAT Essence to match with each element in the KAOS method of requirements engineering; they improved the theoretical supports in KAOS of goal-oriented requirements engineering. [14] coded SEMAT Essence directly in a software program using Java, allowing SEMAT Essence be applied to daily developments.

## 5.2 Answers for RQ2: What parts of SEMAT Essence are used in previous research?

From Fig. 4.5, we know that almost all the papers use SEMAT Essence Kernel to conduct research. Most use Essence Kernel to support new or existing methods. For example, [21] used SEMAT Essence to analyze the state of a development. Then the state is used as a reference to support the TBSE method to find corresponding solutions. On the other hand, only a few papers use SEMAT Essence Language. They used it to define new relationships between SEMAT Essence and other practices. For example, [11] used Essence Language to define the relationship between TDD practice and SEMAT Essence. Our analyses reveal the following. 1) Essence Kernel is more important than Essence Language in current research. 2) Compared with Essence Kernel, which is always used directly to combine with other methods, Essence Language is used to help researchers organize their ideas or find relationships.

From Fig. 4.6, we know that Alpha, State, and Checklist of Essence Kernel are most useful in current research. This is similar to the most useful elements of Essence Kernel during developments. Most papers use Alpha and State to match other methods or refer to the structure of Alpha and State to create their framework.

### 5.3 Answers for RQ3: What inspiration can be obtained based on the classification results?

First, according to the general classification, papers related to combining SEMAT Essence to propose a new method and to optimize SEMAT Essence are very popular in current research. We believe this phenomenon is due to two reasons. First, SEMAT Essence is easily used to support other methods. Its two features, providing a common ground and new visions, support this speculation. Second, papers related to optimizing SEMAT Essence itself comprise a significant proportion, demonstrating the immaturity of SEMAT Essence. Therefore, SEMAT Essence has great potential for improvement. Optimizing SEMAT Essence is worthy of further research. Fewer papers are related to practice and education, indicating that SEMAT Essence is not fully utilized in other areas of research. Future research should focus on applying and verifying SEMAT Essence in other areas.

Next, according to the detailed classification, most research uses the feature to provide new views. Therefore, we infer that this feature not only helps developers review the development process but also assists in investigating existing methods from different views. Finally, most current research uses SEMAT Essence to directly support other methods. However, as mentioned previously, SEMAT Essence is in its infancy and research tends to focus on SEMAT Essence itself.

### 5.4 Limitations

There are three main limitations of this research. The first is the set of main query databases. We only used Scopus as the main query database. Although we used ACM, IEEE Xplore, and Google Scholar as minor query

databases, these were used to search for full texts that were unavailable in Scopus. It may result in the query results to be inaccurate.

The second limitation is the process for data extraction and analysis. Because these tasks were completed by only two people, it is possible that omissions occurred due to their visions, experiences, and skills.

The last limitation is that some papers were read by two authors and the results were combined during weekly discussion meetings. This process has a communication cost, which may result in omissions.



## Chapter 6

# Conclusion and Future Work

This systematic mapping study is used to grasp the current situation of research related to SEMAT Essence. To achieve this goal, this research subdivides the goal into three research questions, which are used to explore the current situation from the general and detailed classifications as well as to draw inspiration from the classifications and usages of SEMAT Essence in the included studies.

According to the analysis results of the general classification, current studies can be divided to research (52%), practice (30%) and education (18%). Most papers use SEMAT Essence to provide new views (63%) compared to common ground (26%). Additionally, most current studies employ SEMAT Essence as is (70%) instead of extending it (30%).

SEMAT Essence Kernel is more usable than SEMAT Essence Language. In addition, in the papers using Essence Kernel, most use three elements: Alpha, State, and Checklist. This is similar to using SEMAT Essence during practice developments. Therefore, we think SEMAT Essence can reflect the situation in practical developments to a certain degree.

According to the classification results, the features of SEMAT Essence can easily support other methods. In addition, SEMAT Essence itself is in its infancy. Future studies can explore and improve immature areas. Finally, research using SEMAT Essence in other areas is lacking. Future studies can also enrich the research of this area.

Our research has some limitations. When we conduct a systematic mapping study for SEMAT in the future, we will optimize our data extraction and analysis process. Additionally, we will employ other main query databases as well as Scopus to improve the accuracy of our research.

# Acknowledgments

I will always be grateful and indebted to my supervisor, Professor Hironori Washizaki for his wise and generous comments, encouragement, support and guidance. He made it possible for me to finish this research.

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Obviously, I will never forget the kind support of my whole family, friends, and lab mates.

# Appendix

## Data Extraction Form

NO.		Title:	
Methods			
Introduction (solved problems etc.)			
Types of Alphas			
Layer of SEMAT			
Methods Combined with SEMAT			
How to combine			
Attention point	Common points	Non-common points	
Remark			

## Included Studies

[11] [12] [13] [14] [15] [16] [17] [18] [19] [20] [21] [22] [23] [24] [25] [26] [27] [28]  
[29] [30] [31] [32] [33] [34] [6] [35] [36]

## Mapping of Individual Studies to Categories

Table 6.1: Studies grouped by year

Year	Studies
2013	[6] [35] [36]
2014	[26] [27] [28] [29] [30] [31] [32] [33] [34]
2015	[21] [22] [23] [24] [25]
2016	[16] [17] [18] [19] [20]
2017	[12] [13] [14] [15]
2018	[11]

Table 6.2: Distribution of general categories in included studies

Categories	Studies
Research	[11] [14] [16] [17] [19] [21] [23] [24] [25] [26] [27] [29] [30] [33] [34] [6]
Practice	[13] [15] [22] [28] [31] [32] [35] [36]
Education	[12] [18] [20] [24] [27]

Table 6.3: Distribution of giving astudies describing common ground and giving new views

Categories	Studies
Common ground	[11] [13] [16] [18] [19] [25] [30]
New views	[12] [14] [15] [20] [21] [25] [26] [29] [30] [33] [34] [6]

Table 6.4: Papers on expanded and non-expanded SEMAT Essence

Categories	Studies
Expanded	[11] [18] [19] [22] [23] [25] [26] [33]
Non-expanded	[12] [13] [14] [15] [16] [17] [20] [21] [24] [27] [28] [29] [30] [31] [32] [34] [6] [35] [36]

Table 6.5: Papers on Essence Kernel and Essence Language

Categories	Studies
Essence Kernel	[11] [12] [13] [14] [15] [16] [17] [18] [19] [20] [21] [22] [24] [25] [26] [27] [28] [29] [30] [31] [32] [33] [34] [6] [36]
Essence Language	[11] [18] [24] [26] [27] [33]

Table 6.6: Use frequency of elements in Kernel

Categories	Studies
Alpha	[11] [12] [13] [14] [15] [16] [17] [18] [19] [20] [21] [22] [24] [25] [26] [27] [28] [29] [30] [31] [32] [33] [34] [6] [35] [36]
State	[11] [12] [13] [14] [16] [17] [18] [20] [21] [22] [24] [25] [26] [27] [28] [29] [30] [31] [32] [6] [36]
Checklist	[12] [14] [17] [18] [20] [22] [24] [27] [29] [31] [32] [6]
Activity	[11] [12] [13] [18] [24] [27] [30] [31] [32] [6]
Activity Space	[11] [12] [13] [18] [24] [26] [27] [30] [31] [32]
Work Product	[11] [13] [18] [24] [26] [27] [31] [32] [6]

Table 6.7: All categories for each included study in studies

Study	Areas of research	Used features		Expanded	Used Parts of Essence		Used Parts of Kernel					
		Common ground	New views		Kernel	Language	Alpha	State	Checklist	Activity	Activity Space	Work Product
[11]	Research	Y	N	Y	Y	Y	Y	Y	N	Y	Y	Y
[12]	Education	N	Y	N	N	Y	N	Y	Y	Y	Y	N
[13]	Practice	Y	N	N	N	Y	N	Y	N	Y	Y	Y
[14]	Research	N	Y	N	N	Y	N	Y	Y	N	N	N
[15]	Practice	N	Y	N	N	Y	N	Y	N	N	N	N
[16]	Research	Y	N	N	N	Y	N	Y	N	N	N	N
[17]	Research	N	N	N	N	Y	Y	Y	N	N	N	N
[18]	Education	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
[19]	Research	Y	N	Y	N	Y	N	N	N	N	N	N
[20]	Education	N	Y	N	Y	Y	Y	Y	Y	N	N	N
[21]	Research	N	Y	N	Y	Y	Y	Y	N	N	N	N
[22]	Practice	N	N	Y	Y	Y	Y	Y	N	N	N	N
[23]	Research	N	N	Y	-	Y	-	-	Y	-	-	-
[24]	Education	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
[25]	Research	Y	N	Y	N	Y	Y	N	N	N	N	N
[26]	Research	Y	Y	N	Y	Y	Y	Y	N	Y	Y	Y
[27]	Education	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
[28]	Practice	N	Y	N	Y	Y	Y	Y	N	N	N	N
[29]	Research	N	Y	N	N	Y	Y	Y	Y	N	N	N
[30]	Research	Y	N	N	N	Y	N	Y	N	Y	Y	N
[31]	Practice	N	Y	N	N	Y	N	Y	N	Y	Y	Y
[32]	Practice	N	Y	N	N	Y	Y	Y	Y	Y	Y	Y
[33]	Research	N	Y	Y	Y	Y	Y	Y	N	N	N	N
[34]	Research	N	Y	N	Y	Y	Y	Y	N	N	N	N
[6]	Research	N	Y	N	N	Y	Y	Y	Y	N	N	Y
[35]	Practice	N	Y	N	N	Y	Y	Y	Y	N	N	N
[36]	Practice	N	Y	N	Y	Y	Y	Y	N	N	N	N

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