

## Organisational Support in Knowledge Transfer Activities towards ERP Success: Scale Development and Validation

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### Abstract

The successes of ERP system in an organization depend on knowledge transfer activities being made and the effectiveness of the transferred knowledge between the parties involved. It is important to determine a set of knowledge transfer activities that need to be done besides efforts undertaken by the organisation in ensuring ERP success. Currently, there is still lacking of standard knowledge transfer measurement and organisational support that impacted ERP system. Previous research has reported various factor impacted the transfer of knowledge in strategic alliances and joint venture. Nonetheless, organisational support is the least factor mentioned especially studies from Malaysia. Addresses this gap, the main purpose of this study is to develop a validated scale of organisational support in supporting knowledge transfer activities towards ERP system success. The study has adapted six stages of scale development and validation of measurement items according to legitimate measures. The measurement scales formed are based on literature review and field studies conducted to increase the reliability and validity values. Organisational support constructs were divided into Top Management Support, Communication and User Training and Education. Total of 16 items have been successfully established for further validation.

**Keywords:** ERP success; Knowledge transfer; Organisational support.



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### 1. Introduction

Enterprise Resource Planning (ERP) is an important system that helps companies to reach their business purposes and to increase the company productivity and operational efficiency to fit with global competitiveness (Aarabi *et al.*, 2012); However, some of the companies experience ERP implementation failure where the system did not meet their expectation. These include lower return than expected, project does not complete within the timeline given and incorrect system function (Ghosh, 2012). Due to high percentage failure of ERP implementation, previous study has highlighted the importance of Knowledge Transfer (KT) and Organisational Support (OS) to increase the ERP success level. Despite the wide range of KT studies, a few studies focused on OS measurement in context of KT activities towards ERP system success. Measurement can be defined as method that assigning numbers in order to quantify phenomena (Kimberlin and Winterstein, 2008). Key indicators of the quality measuring instrument are the validity and reliability. Validation involves collecting and analyzing data to assess the accuracy of an instrument while reliability estimates the stability of measures and internal consistency of measurement instrument. These two are crucial component of research quality.

Most of previous scale development and validation activities become more challenging because the researcher failed to develop appropriate conceptual definition of focal construct. Secondly, fail to specify measurement model that relates the latent construct to its indicators and lastly unable to provide evidence that used to represent either focal construct measure what it supposed to measures (Mackenzie *et al.*, 2011).

However knowledge transfer is general information and need to be more specific. Maas *et al.* (2016) affirmed that there are five types of knowledge in ERP system success including business knowledge, technical knowledge, product knowledge, company specific knowledge and project knowledge, (Brito *et al.*, 2017) mentioned four types of knowledge include process, domain, technical and cultural while Musa and Usman (2012) mentions three knowledge should be considered for ERP system success include project management knowledge, business and management knowledge and technical knowledge and suggest business and management knowledge are most crucial for ERP post-implementation stage. Brito *et al.* (2017) also mentioned there are five aspects involving the transfer of knowledge for outsourced software. These are nature of the knowledge, relationship between client and supplier, human aspects, applicable model and frameworks and supporting tools.

Thus, it is important to clearly operationalize the knowledge transfer definition to become more specific on the types of knowledge should be transferred. After the construct definition, the researcher will validate the construct by following 6 steps of Mackenzie *et al.* (2011) scale development and validation process.

## 2. Literature Review

There are three mentioned constructs need to define in order to clearly understand and specific on the paper objective. These are Organisational support, Knowledge Transfer and ERP success. This is important to avoid poor construct definition cause to rejected of indicators of focal construct because they are not capturing what they are propose to capture [Mackenzie et al. \(2011\)](#). The sub sequence section will discuss in details each step taken to develop the instrument of the item by adopted ([Mackenzie et al., 2011](#)) study.

### Step 1: Conceptualization of construct

Before the construct conceptualization was written, there are four factors to be considered. The factors include understand and examine how the focal construct has been used in prior research, specify the nature of the construct conceptual domain, specify the conceptual theme of the construct and define the construct in unambiguous terms.

Based on study by previous studies, organisational support was operationalise as commitment of an organization in two ways, namely, attitudinal commitment and behavioural commitment. Attitudinal commitment derives from employees willingness to continue to work in the organization to achieve an organization goals while behavioral commitment is employees responsibility for the organization by sharing their knowledge and skills with the organization as well with another employees to minimize costs and maximize profits ([Demirel, 2013](#)). [Eisenberger et al. \(1986\)](#) define organisational support as a perception of an employee towards their organization to values their contributions and meet their socio-emotional needs to assess the benefits of increased work effort and cares about their well-being. In this study, to fit with the objective of the study, organisational support will define as commitment from high level of employees who have the expertise in some area by sharing their knowledge and skills to other employees to achieve organisational goals and objectives. Refer [table 1](#).

**Table-1.** Organisational Support Construct Conceptualization

Definition of the construct based on prior research	OS as commitment of an organisation in two ways, namely, attitudinal commitment and behavioral commitment ( <a href="#">Demirel, 2013</a> ) OS is a perception of employee towards their organisation to values their contributions and meet their socio-emotional needs and to assess the benefits of increased work effort and cares about their well-being ( <a href="#">Eisenberger et al., 1986</a> )
Nature of the construct	Entity : Organisation General property : Managers expertise towards organisational performance
Conceptual theme of the constructs	Multi-dimensional
New construct definition	OS as commitment from high level of employees who have the expertise in some area by sharing their knowledge and skills to other employees to achieve organisational goals and objectives.
Types	Reflective

The second construct is Knowledge Transfer. Knowledge transfer is define as a process which one units is affected by experienced by another [Xu and Ma \(2008\)](#). [Paulin and Suneson \(2012\)](#) agreed knowledge transfer as unidirectional communication of knowledge between individuals, groups organisation. [Lech \(2011\)](#) mentioned knowledge transfer can be classified into two categories codification and personalization. Codification is a knowledge transfer based on documented document or database while personalization involving communication between people. [Gera \(2012\)](#) affirms that knowledge transfer as identifying knowledge that already exist, attaining it and applying this knowledge to develop new ideas to make it better or safer. For this paper, all knowledge transfer will be happen internally because the researcher is only focus on client side. Thus, knowledge transfer will be define as all knowledge which is transferred between managers, key user and end user that will give benefit towards ERP implementation success. Refer [table 2](#).

**Table-2.** Knowledge Transfer Construct Conceptualization

Definition of the construct based on prior research	KT is a process which one unit is affected by experienced of another. <a href="#">Xu and Ma (2008)</a> KT as unidirectional communication of knowledge between individuals, groups or organization ( <a href="#">Paulin and Suneson, 2012</a> ) KT can be classified into two categories, codification and personalization. KT as identifying knowledge that already exists, attaining it and later on applying this knowledge to develop new ideas or enhance the existing ideas to make a process/action faster, better or safer ( <a href="#">Gera, 2012</a> )
Nature of the construct	Entity : Person General property : Action in behaviour and activity
Conceptual theme of the constructs	Multi-dimensional
New construct definition	KT is all knowledge which is transferred between managers, key user and end user that will give benefit towards ERP implementation success
Types	Reflective

The last construct is ERP success. [Gorla and Somers \(2014\)](#) define ERP as a software which attempts to integrate all departments information into single computer system while [Ramayah et al. \(2007\)](#) define ERP as a tool for business solution which the aims is to give management to get

the accurate information to make timely decision. [Aarabi et al. \(2012\)](#) also define ERP as an important system which help to increase company productivity and operational efficiency to fit with the global competitiveness. Follow this definition, the researcher will define ERP as an integrated software which help organisation to increase their productivity and help managers to make accurate and timely decision. Refer [table 3](#).

**Table-3.** ERP success Construct Conceptualization

Definition of the construct based on prior research	<b>ERP as a software which attempts to integrate all departments information into a single computer system (<a href="#">Gorla and Somers, 2014</a>)</b> <b>ERP is a tool for business solution which the aims is to give management to get accurate information so that they can make timely decisions (<a href="#">Ramayah et al., 2007</a>)</b> <b>ERP as an important systems that help companies to reach their business purposes and to increase the company productivity and operational efficiency to fit with global competitiveness (<a href="#">Aarabi et al., 2012</a>)</b>
Nature of the construct	Entity : Organisation General property : ERP system performance
Conceptual theme of the constructs	Uni-dimensional
New construct definition	ERP is an integrated software which help organisation to increase their productivity and help managers to make accurate and timely decision.
Types	Formative

Step 2: Generate item to represent the construct

After defining the focal construct, the second stage is development of measures. Set of item will be generate to represent the construct and the content validity will be checking. Item should represent the domain construct and will be getting from many sources. For this paper, the researcher will follow 22 critical success factors as a benchmark as mentioned in [table 4](#). According to [Somers and Nelson \(2001\)](#) there are 22 listed critical success factors namely top management support, project champion, user training and education, management of expectations, vendor/customer partnerships, use of vendor's development tools, careful selection of the appropriate package, project management, steering committee, use of consultants, minimal customization, data analysis and conversion, dedicated resources, project team competence, change management, clear goals and objectives, education on new business process, interdepartmental communication, interdepartmental cooperation and ongoing vendor support, architecture choices and business process reengineering. Among all factors, factors regarding vendor will be remove because the researcher only focus on client side. Refer [table 5](#). The other factors will be selected based on recommendation by previous study and suite with the construct definition mentioned before.

[Supramaniam and Kuppusamy \(2010\)](#) in their study has categorized interdepartmental cooperation, user training and education and education on new business process in knowledge management category. [Hung et al. \(2012\)](#) in their study mentioned that interdepartmental coordination and top management support and internal incentives as a knowledge transfer climate in ERP implementation. [Dezdar and Ainin \(2011\)](#) also agree that top management support, training and communication are set of organisational factor. [Kim et al. \(2005\)](#) conclude that communication with project teams, top management support, coordinating among different functional unit and more IT competent user will help to the success of ERP project. [Liu \(2011\)](#) mentioned that top management support, corporate vision, reengineering, project management, appropriate package selection, IT competent user and training and education as factor influencing ERP knowledge management.

[Musa and Usman \(2012\)](#) suggest, some knowledge will be transferred depends on the ERP phase of implementation. For post ERP implementation, business and management knowledge are most crucial for ERP implementation success. On that phase, most of the business knowledge was transferring, using and storing. [Somers and Nelson \(2001\)](#) also agree that interdepartmental communication, top management support, interdepartmental cooperation, vendor support and user training and education as most crucial activity during after post ERP implementation and [Pan et al. \(2007\)](#) mentioned that communication, top management support and user training and education as the important factors. [Lee et al. \(2016\)](#) also suggest top management support as factors towards system success. There are two mentioned factor that is not based on the ([Somers and Nelson, 2001](#)) 22 critical success factor, thus these factor will be added as a new factor. Refer [table 6](#). [Table 7](#) contains summarize information of factors influencing knowledge transfer activities for ERP system success.

**Table-4.** Critical Success Factor for ERP success

1	Top Management Support
2	Project Champion
3	User Training and Education
4	Management of Expectations
5	Careful selection of the appropriate package
6	Project Management
7	Steering Committee
8	Minimal Customization
9	Data analysis and conversion
10	Dedicated resources
11	Project team competence
12	Change management
13	Clear goals and objective
14	Education on new business process
15	Interdepartmental communication
16	Interdepartmental cooperation
17	Architecture choices
18	Business process reengineering

**Table-5.** Critical Success Factor for ERP success that remove from the study

19	Vendor/Customer partnership
20	Use of vendor development tools
21	Use of consultants
22	Ongoing vendor support

**Table-6.** Additional factor from previous study

23	Internal Incentives
24	Coordination

**Table-7.** Factors influencing Knowledge Transfer activities towards ERP success

	1	3	5	6	11	13	14	15	16	18	23	24
(Supramaniam and Kuppusamy, 2010)	/						/		/			
(Hung <i>et al.</i> , 2012)	/								/		/	
(Dezdar and Ainin, 2011)	/	/						/				
(Kim <i>et al.</i> , 2005)	/				/			/				/
(Liu, 2011)	/	/	/	/	/	/				/		
(Somers and Nelson, 2001)	/	/						/	/			
(Pan <i>et al.</i> , 2007)	/	/						/				
(Lee <i>et al.</i> , 2016)	/											
<b>Total</b>	<b>7</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>%</b>	<b>25</b>	<b>18</b>	<b>4</b>	<b>4</b>	<b>7</b>	<b>4</b>	<b>4</b>	<b>14</b>	<b>11</b>	<b>4</b>	<b>4</b>	<b>4</b>

Journal selected were most similar to the study. Thus, based on previous study, we can see top management support, user training and education and communication were frequently selected. Refer [table 7](#). These three factors also relate with construct definition mentioned before and under scope of the study, thus, these factors will be selected as indicator of the construct.

The main focus of Top Management Support is to provide necessary resources to the ERP success. At the same time, communication between various parties also important to ensure the knowledge transfer happen properly and accurately. User Training and education was one of the critical knowledge transfer channel which help end user to understand the function of the system and able to give correct information when needed. The full definition of the sub construct will be mention in [table 8](#).

**Table-8.** Operationalisation of Organisational Support Main Construct

Sub –constructs	Sub-construct definition
Top Management Support	Top management willingness to provide necessary resources, spend some time to understand what benefits gets from the system and clearly define company business goals
Communication	The higher the capacity of communication channel (transfer method), the more information can be sent and receive and the more higher the chance of successful transfer.
User training and education	Sufficient training can increase the knowledge transfer activities.

Based on previous study, (Dezdar and Ainin, 2011); (Ramayah *et al.*, 2007) mention that it is top management responsibility to provide necessary resources in terms of workmanship and financial for ERP success. Top management must clearly understand the organisation goals and objective on buying the system (Kim *et al.*, 2005) and also must inform employee about the managerial strategies on why the company buy the system and what the company expect from it in return (Hung *et al.*, 2012). Top management also must always have solution when there is a problem regarding the system. They should understand the functions and limitation of the new system. It is top management responsibility to provide accurate knowledge from the early implementation of the system (Lee *et al.*, 2016). Most of the company who had fails to reap the benefit from ERP system because they have little support from the top management.

Second selected indicator is communication. Communication is the most important determinant to ensure knowledge transfer occurs maximally. Hence, Szulanski and Jensen (2016) claimed the higher the capacity of communication channel (transfer method), the more information can be sent and receive and the more higher the chance of successful transfer. Communication creates understanding among employees, that may lead to shared organisation beliefs (Ramayah *et al.*, 2007). Communication is an important element of psychological contract and will positively influence knowledge transfer (Ko, 2014). In enterprise system implementations, communication between intra organisations will help ERP implementation project done efficiently. There are many communication tools such as newsletter, monthly bulletins, weekly meetings, video conferencing, electronic communication channel, open communication and so on to keep users updated. The most important things are there must be inwards and outwards communication between project team and organization (Jafari *et al.*, 2006).

The last one is training and education among team members. It is crucial effective knowledge transfer factor to put all staff in on-job and off-job training. This will enhance the ability of workers to perform their daily work. As mentioned by Dezdar and Ainin (2011) sufficient training can increase the knowledge transfer activities. ERP projects should have at least a six month learning curve of the project (Somers and Nelson, 2001). Some of the organisation had selected key user to train on using the system and then train back other end user in a company. This person is called as core team (Dixit, n.d). Training must start with understandable of project team about the system, operation line, project management and end with the end user of the system (Dezdar and Ainin, 2011). Different level of project and different user requires different types of training. There are many training methods include conferences, workshops and rotation of engineers. Based on above definition, the study listed 16 measurement items shown in table 9.

Table-9. Item Generation

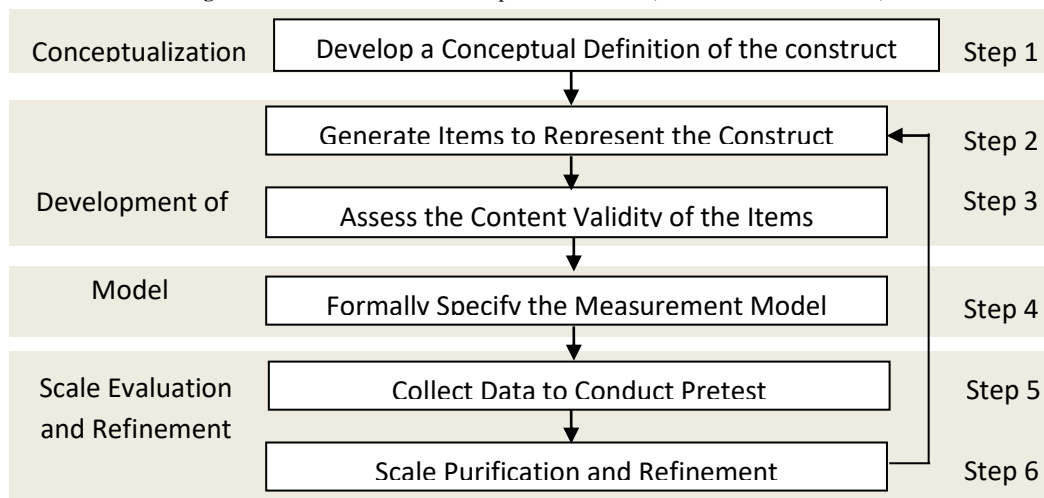
Sub Constructs	Items	Adapted
Top management support (TMS)	<ol style="list-style-type: none"> <li>1. Top management had provide an adequate workmanship for building a successful system (OS1)</li> <li>2. Top management had provide an adequate financial for building a successful system (OS2)</li> <li>3. Top management always explain managerial strategies to the employee and the important of ERP knowledge (OS3)</li> <li>4. Every year we budget a significant amount of funds for new information technology hardware and software (OS4)</li> <li>5. Top management always give solution on every matters during system implementation. (OS5)</li> </ol>	(Dezdar and Ainin, 2011); (Ramayah <i>et al.</i> , 2007)
Communication (Comm)	<ol style="list-style-type: none"> <li>1. Any information regarding project success will be informed to the project team without any doubt.(OS6)</li> <li>2. Every team project is responsible to do a report if encounter any problem regarding system usage. (OS7)</li> <li>3. We have routine meeting to report the project progress and discuss the issues that arise during the execution (e.g. regular reflection sessions, around the table discussions, project meetings, visit to remote locations) (OS8)</li> <li>4. Sharing of information in informal meeting is encouraged during the IT outsourcing project execution (e.g. coffee breaks, social events) (OS9)</li> <li>5. The important changes to the project are transmitted to all project units (OS10)</li> </ol>	(Vandaie, 2008), (Ramayah <i>et al.</i> , 2007; Vandaie, 2008),(Ko, 2014), (Jafari <i>et al.</i> , 2006; Szulanski and Jensen, 2016)
User training and education (UTE)	<ol style="list-style-type: none"> <li>1. I'm taking less than 6 months to fully understand the system functions (OS11)</li> <li>2. I received training directly from the vendor (OS12)</li> <li>3. I received training from company key user that already trained by the vendor (OS13)</li> <li>4. I learned by myself how to use the system by using training material provided from the vendor (OS14)</li> <li>5. I'm provided with user friendly manual which is easy to understand (OS15)</li> <li>6. After the training session, I am fully applying this system instead of manually use before (OS16)</li> </ol>	(Dezdar and Ainin, 2011),(Ramayah <i>et al.</i> , 2007), (Somers and Nelson, 2001),(Dixit, n.d)



### 3. Methodology

As mentioned earlier, the study has adapted six stages of scale development and validation of measurement items according to Mackenzie *et al.* (2011) scale development procedure. By following these process, 16 items were generated by referring on previous scholar suggestion. Next, the researcher will checked the content validity and select the measurement and conduct the pretest. Refer figure 1 for overview of scale development procedure by Mackenzie *et al.* (2011).

**Figure-1.** Overview of Scale Development Procedure (Source : McKenzie , 2011)



Step 3: Assess the content validity of the items

After generate relevant measurement items, the validity of the items were checked. The researcher use face validity by doing simple interview with one manager and two executive level employees from different factory. They were asked about important element to achieve ERP success in their company. Three of them agree with the question and able to answer all question accordingly. In this study, the selected respondent must be an expert and understand very well the business and technical process of the organisation. Based on them, training is a critical channel on transferring the knowledge and must be continuously done until the end user fully understand the system. Overall, the question was considered reliable because all respondent answer it in a same way. Thus, the researcher will proceed with the next step.

Step 4: Formally specify the measurement model

The next step is to formally specify the measurement model. One qualitative explanation unable to be measure unless we put the number in every description given. Numeral with meaning will become numbers and enable to be used for mathematical and statistical techniques for descriptive, explanatory and predictive purposes.

In this study, the researcher adopted ordinal scale measurement because all question related to respondent opinion either completely disagree to completely agree. 7 point Likert scale was choose because it is more likely to reflect a respondent's true subjective evaluation of a usability questionnaire item than a 5-point item scale (Finstad, 2010). The scale was ranking from 1- "Completely Disagreed" to 7-"Completely Agreed".

Step 5: Collect data to conduct pre test

After completed the questionnaire, pre testing will be done using small group of respondent to check whether the data is valid for the bigger scale survey. Respondent will be selected from executive level and above because Enterprise Resource Planning (ERP) is highly generalized to meet the multifarious unique requirements of the specific situation thus only management level will understand the system well.

Questionnaires were mailed to 111 medium and large foods manufacturing across Malaysia. Researcher follows up the mail respondent by phone call to ensure they received the email and asked some question about ERP system implementation. There are some companies that do not use the ERP system, thus those companies were rejected from the list. A total of 56 respondents have agreed to participate in the survey and replied the email.

### 4. Results and Findings

Step 6: Scale purification and refinement

Based on the data collected, the researcher does the scale purification by running reliability test. Reliability test is function to evaluate either every respondent understand the question in a same way or the equivalence of sets of items from the same test. Reliability coefficients will range from 0.00 to 1.00. Higher coefficients indicating higher levels of reliability (Kimberlin and Winterstein, 2008)

Using the Statistical Package of Social Sciences (SPSS) software, the result shows that value for Cronbach's  $\alpha$  for all construct and indicator are more than 0.5 except for user training and education. Therefore to increase the overall reliability value, 1 item from user training and education were deleted. This is based on inter-item correlation matrix report which shows that OS13 give negative value. Thus item OS13 was deleted to increase the value of Cronbach's  $\alpha$ . After deleted item OS13, new Cronbach's  $\alpha$  value is increase to 0.565 from 0.333. Reliability

value more than 0.5 was consider as “adequate” by Kline (2005). The final remaining items are 15 items. Based on this report, the questionnaire will consider as reliable and data collection will be proceed. Refer table 10.

Table-10. Reliability Analysis

Construct	Cronbach's $\alpha$	Item Label	Deleted Item	No. of remaining item
<b>Organisational Support</b>				
<b>TMS</b>	0.969		None	5
<b>Comm</b>	0.859		None	5
<b>UTE</b>	0.565	OS13	I received training from company key user that already trained by the vendor	5

Prior to scale validation, we will also present the descriptive analysis of OS measurement items in Table 11. These include; i) the mean values, ii) skewness values, iii) standard deviation and lastly iv) kurtosis values. Based on data in table 11, we can conclude that only item OS3, OS5, OS6, OS7, OS10, OS11, OS12, OS13 and OS16 are normal.

Table-11. Descriptive Analysis

Item	Mean	Std. Deviation	Skewness	Kurtosis
OS1	5.04	1.111	- 3.07	2.95
OS2	5.04	1.111	- 3.07	2.95
OS3	4.80	1.227	- 1.85	0.36
OS4	5.04	1.111	- 3.07	2.95
OS5	4.80	1.227	- 1.85	0.36
OS6	5.23	.991	- 2.27	2.26
OS7	5.45	.658	1.26	0.00
OS8	5.20	.862	- 4.57	9.03
OS9	5.07	.871	- 5.27	12.33
OS10	5.23	.991	- 2.27	2.26
OS11	4.50	1.062	- 0.89	0.53
OS12	4.93	1.059	- 1.93	0.52
OS13	4.41	1.203	- 0.31	0.08
OS14	4.73	.774	- 2.22	4.99
OS15	4.61	.846	- 4.32	4.83
OS16	4.73	.751	1.53	0.76

## 5. Conclusion

This paper discussed the scale of development measure for organisational support in knowledge transfer activities towards

ERP system success. The study has been made in Malaysia focusing in food manufacturing. It is believed that the framework might be useful for further study on ERP success in Malaysia.

## Acknowledgement

This paper was partly sponsored by the Centre for Graduate Studies UTHM.

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