Information Technology Strategy in Applying and Developing Knowledge Management Systems (R & D Study to Improve the Quality of Lecturers' Performance in Higher Education)

A T R Rosa
{rosaatrxnov@gmail.com}

Universitas Islam Nusantara (UNINUS) Bandung, Indonesia

Abstract. This study aims to describe the knowledge management process carried out at the Postgraduate School (SPs) of Uninus Education in Bandung. Type of qualitative research with the design of the Development study. Postgraduate Uninus is one of the study programs in Uninus that has implemented a knowledge management system in the online helpdesk Information Technology application. This application serves to help deal with information needs around the learning process or user complaints in relation to questions, services, technical support or complaints regarding certain learning and services by utilizing the system so as to facilitate tracking of settlement actions. With the implemented knowledge management system in this IT Helpdesk application priority scale measurement is needed to determine the performance of the application [2], [4]. The method used is descriptive analysis and Analytical Hierarchy Process (AHP). By using the Knowledge Management Diagnostic (KMD) model and data analysis techniques using descriptive analysis with the Analytic Hierarchy Process (AHP), information can be obtained on how alternative Knowledge Knowledge, Knowledge Capturing, Knowledge Sharing, Knowledge Applications comparisons of IT Helpdesk applications can be obtained Knowledge results Application System. This research is expected to be able to help in determining the best strategy in giving decisions on the development of IT helpdesk applications and hoping to improve the quality of human resources, especially educators and education personnel related to improving the performance and quality of education.

Keywords: Knowledge Management System, IT Helpdesk Application, Priority Scale Measurement, Analytical Hierarchy Process (AHP).

1. Introduction

Along with the rapid development of information technology, the demand for information in an educational institution is increasingly complex. Not only on information needs, but the need for knowledge is also very necessary. The development of information technology systems occurs very quickly with a high level of competition, so that requires an educational institution specifically seeks to improve quality accompanied by an increase in human resource capabilities[1], [2]. The ability to utilize the advantages of information technology can bring an educational institution to be better at carrying out all operational activities[3], [4].

The knowledge management concept tries to combine knowledge and management with all the resources that are in the institute so that it is easy to store, retrieve, and distribute to the

right people quickly according to needs. So that the expected knowledge does not depend on humans (education staff). Existing knowledge must not be lost even it will always develop along with the progress of SPs, especially [3], [5] As an important resource, knowledge is not only stored and reused as data storage in general, but a system or tools that can help in managing existing knowledge so that it can be used appropriately [3]. The Knowledge Management System (KMS) is a tool that can facilitate each use in collecting, managing, storing, and reusing and distributing existing knowledge in educational institutions in the Graduate School studied as one of the Education / Education Management study programs. In connection with the things mentioned above, the writer tries to do research with the title: Strategic Development of the Implementation of Knowledge Management System in IT Help Desk Applications: Developmental studies in Uninus Graduate School Bandung.

Knowledge becomes a useful asset in dealing with digital competition in various fields[6], [7]. This development has triggered organizations, both commercial and non-commercial organizations such as education, to realize the importance of the role of knowledge in improving quality. From this point of view, an organization is seen as a body of knowledge that is composed of individual knowledge [3], [7], [8] stating that knowledge in an organization can be transformed from individual dimensions to the collective dimension or from the tacit form to the explicit form, the organization can provide opportunities for people to interact directly (face to face)[3]. On the basis of this conception, an effort to manage knowledge in an organization emerges, which is called knowledge management. So, the basic idea of the concept of knowledge management is the dissemination and reuse of knowledge by others in one organization [3][9]. Many organizations have adopted this concept in improving organizational quality. But organizations that have adopted conception are commercial ones. Knowledge management has not been widely applied to educational organizations, such as schools, but according to[9], [10] educational institutions that are organizations whose activities are related to knowledge must utilize the concept of knowledge management to improve organizational performance.

2. Identification of Problems

With the increasing development of Information Technology (IT), the Helpdesk's ability to manage and support IT facilities is increasingly demanded. With a computer system that already exists at this time the condition of IT must be available because if there is interference or damage can result in disruption of the operational process which results in disruption of the Teaching and Learning Process

Postgraduate Uninus has now implemented an IT Helpdesk application that aims to provide services to users and function as assistance in the initial steps to resolve IT problems and around processes in education. In addition to the helpdesk, users (Lecturers and Education Personnel) are also required to improve their skill skills regarding IT, because users cannot fully rely on the helpdesk in resolving IT problems, users are also expected to be able to independently overcome recurring problems [2], [11]. Based on the description above, the research problem that will be raised by the author is the absence of a strategy to determine knowledge management standards to improve the performance of lecturers and employees.

3. Formulation of The Problem

Based on the background, identification and limitation of problems, the research problems can be formulated as follows:

1. How is the level of readiness especially lecturers and employees in implementing the knowledge management system in online helpdesk applications for internal users in Uninus?
2. What strategies are used in developing the implementation of the knowledge management system in the Online IT Helpdesk application at Postgraduate Uninus Bandung?

4. Theoretical Basis

4.1 Definition of Knowledge Management

Knowledge management is the process of managing various assets of organizational knowledge both in HR (tacit) or documents (explicit)[12] so that this knowledge can be valuable to users in knowledge management that enable the creation, communication, and application of various knowledge to achieve organizational goals.

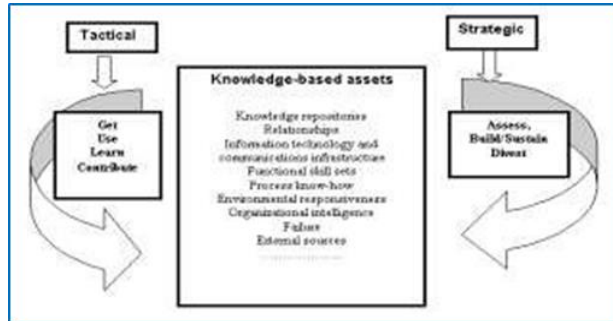### 4.2 Knowledge Management System framework

A new understanding is always developed in accordance with organizational experience in the application of knowledge management. With the conditions above [1], [4], [13], in his book "Knowledge Management Fieldbook" conducts research to obtain approaches that can be used as guidelines for developing knowledge management in organizations introducing a knowledge management framework and methods for diagnosing organizational conditions in implementing KM in the form of Knowledge Management Diagnostic (KMD) KM framework is developed from two lines of activities that occur simultaneously in an organization according to [3], [13]namely:

4.2.1 Short Term Process

Knowledge is used everyday in responding to the needs and opportunities of the market. The process of developing knowledge from daily operational activities gets (get), uses (uses), learns (learns), and contributes (contributes) by sharing knowledge [3], [9]First stage: Asses: a) Articulation (b) Awareness (Access) Access (Guidance) and Completeness. Second stage: Build and Sustain: a) Permealibility; b) Freedom (Freedom); Third stage: Divest Visibility and. Habituation: The practice of learning becomes commonplace and occurs throughout the organization. Fourth stage Contribute: a) Motivation); b) facilitation c) Trust.

4.2.2 Long-term Process (Strategical Process)

Namely to connect organizational knowledge assets to strategic needs. The first stage: Asses: Perpsektif (perspective) and Integration (integration): Second stage: Build and Sustain (direction) and relationship (connection); Third stage: Divest: (a) Patience (forbearance) and (b) Conversion (conversion).

Figure 1: Bukowitz KM Framework

4.3 Knowledge Management Diagnostic (KMD)

To help define how well an institution displays various aspects of the Knowledge Management (KM) framework,[1] introduces the KMD method created based on the KM framework described earlier. KMD is in the form of a series of questions that will be weighted to show how far the activities in an organization can support the implementation of KM [1], [10] thinking about the elements that influence the successful implementation of KM in an organization

Table. 1 Calculation of the weight values of all KM activities

Number of Points S		:		x	3	=
Number of Points M	:			x	2	=
Number of Points W	:			x	1	=
Amount of Point Value						
Total Percentage Value = (Total Value Point 60) * 100						

Table Calculation of the weight values of all KM activities The number of points S means is the total number of answers to the strong points chosen by the surveyed people from twenty questions. Likewise with M points for Moderate answers and W points for Weak points selected, Then the three points are added after multiplied by each weight to get the number of points. The maximum number of points this value is 60 from the weight of the highest value point S (3) multiplied by the total question, so 20x3 = 60.

The average value obtained based on his research experience ranges from 30% -70%. Whereas the calculation of the total value of the weight is done by adding the point values for all KM activities, then the results are divided by 420 (from 60 x 7 KM activities). KM has an average total value of 55%. KMD is intended to identify KM activities which are still weak in an organization

Many organizations have adopted this concept in improving organizational quality. But organizations that have adopted conception are commercial ones. Knowledge management has not been widely applied to educational organizations, such as schools, but according to [9]educational institutions which are organizations whose activities are related to knowledge must utilize the concept of knowledge management to improve organizational performance. The research results indicate that the application of knowledge management in schools is possible, but the application of the knowledge management concept requires the following preconditions.

First, on the basis of research findings[14] which found that there is a meaningful relationship between leadership and knowledge management, it takes leaders to provide trained human resources to support knowledge management and leaders pay more attention to the process of creating, transferring, dividing knowledge in organizations and appreciate the experience of staff.

Second, findings [8], [11], [15] also found that there was a close relationship between organizational climate and knowledge management effectiveness. Findings through research results that the school climate and trust are positively correlated with knowledge management processes. Thus, the existence of a conducive organizational climate, supportive leadership, the availability of human resources and supporting infrastructure play a significant role in the effectiveness of knowledge management.

4.4 Knowledge Management System (KMS)

Technology that enables effective and efficient knowledge management is a Knowledge Management System (KMS). Changes that occur within and outside the organization require the organization to continuously learn and adapt, in order to be able to follow changes or be in front of these changes in order to be able to maintain themselves and not be left behind in the turmoil of change. According to [11] there are several factors that determine the implementation of Knowledge Management and Knowledge Management System are described as follows:
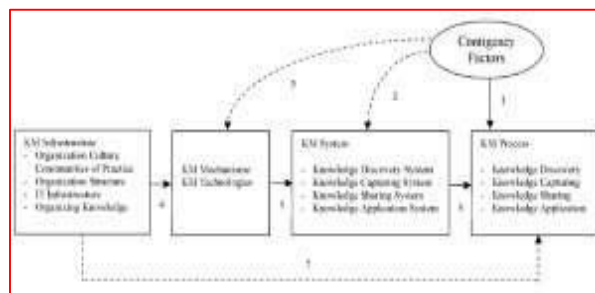
Figure 2. Contingency Factor

The Knowledge Management System has 4 (four) classifications of type elements that must be built, namely:
1. Knowledge Discovery System (KDS), namely: a system created in order to help create Knowledge through new ways of doing things, and facilitating in the process of socialization in the formation of new knowledge.
2. Knowledge Capture System (KCS), namely: a system created to help obtain and place organizational knowledge and individual knowledge, namely tacit and explicit, knowledge

can be captured using mechanisms or technologies, so that knowledge can be shared and used by other parties.

3. Knowledge Sharing System, namely: about how to provide service management and management of the distribution of individual knowledge and design to assist users in carrying out various activities on their knowledge, both tacit and explicit.
4. Knowledge Application System (KAS), namely: how to build and convey experiences about how an organization implements its system and helps the process of solving it using individuals who have knowledge passed on to other individuals without the need for learning or learning knowledge processes.

4.5 Helpdesk

The Helpdesk is a support function that has implications for the operational support of the system because many businesses are currently very dependent on the implementation of information technology. The Helpdesk serves to support to ensure that users or users of information technology systems can continue to run well [16].

4.6 Analytical Hierarchy Process (AHP)

The Analytical Hierarchy Process (AHP) was developed [4], [11] to organize information and judgment in choosing the most preferred alternative[3]. By using AHP, a problem will be solved in an organized frame of mind, so that it can be expressed to make effective decisions on the issue. [3] AHP has many advantages in explaining the decision-making process because it can be described graphically so that it can be understood by all parties involved in decision making. With AHP, complex decision processes can be broken down into smaller decisions that can be handled more easily. In addition, the AHP also tests the consistency of the assessment, if there is a deviation too far from the value of perfect consistency, this indicates that the assessment needs to be corrected, or the restructured hierarchy.

The steps for preparing AHP include: (a) Preparation of the Hierarchy The problems to be solved become the elements, namely criteria and alternatives, then arranged into a hierarchical structure; (b) Criteria and Alternative Assessment Criteria and alternatives are assessed through pairwise comparisons. For various problems, a scale of 1 to 9 is the best scale in expressing opinions in comparative values.

Priority Determination For each criterion and alternative, pairwise comparators should be made. Relative comparison values are then processed to determine relative rank. Both qualitative and quantitative criteria can be compared according to judgment that has been determined to produce weights and priorities. Weight or priority is calculated by matrix .

Research Steps
1. Formulating Problems; Literature Study
2. Test Validity with the Cochran Q Test Method.
3. Knowledge Management Diagnostic (KMD)
4. Application of knowledge management in the   application helpdesk method with Cochran Q Test.
5. Determine the hierarchy with the AHP approach
6. Determination of KMS Priority Scaleand Interesting Conclusions

5. Results and Discussion

1. Calculation of Knowledge Management Diagnostic Survey (KMD) data In conducting the survey, it can be submitted or viewed in the form of Knowledge Management Diagnostic questions. Each Knowledge Management activity has 20 questions answered by all. The trick is to choose whether the questions written in the organization of implementation include Strong (S), Moderate (M) or Weak (W), so if the answer S, M and W in the amount for each Knowledge Management activity must be 20, if less than that there may be questions that have not been answered. The number of respondents in the SPs survey amounted to 10 people. The complete survey results can be seen in the appendix, for an example of one of the activities the survey obtained was as follows:

Table 2. Survey Results of KMD Education Management Graduate School

No	Aktivitas	1			2			3			4			5			6			7			8			9			10			Rata-rata		
		S	M	W	S	M	W	S	M	W	S	M	W	S	M	W	S	M	W	S	M	W	S	M	W	S	M	W	S	M	W	S	M	W
1	Get	12	7	1	13	7	0	11	8	0	9	9	2	8	10	2	13	7	0	12	7	1	10	8	2	11	7	3	12	8	0	11	8	2
2	Use	9	10	1	11	9	1	12	8	2	10	9	1	12	8	0	13	5	3	10	8	2	9	11	0	12	8	2	9	8	3	11	8	2
3	Learn	10	8	2	9	11	0	12	8	2	13	7	0	10	9	1	11	8	1	10	8	2	10	8	2	12	8	0	14	6	0	11	8	2
4	Contribute	10	10	0	11	7	2	9	8	3	12	8	2	11	9	0	10	10	0	11	7	2	11	9	0	10	8	2	11	8	1	11	8	2
5	Asses	9	10	1	12	8	0	10	8	2	13	7	0	10	5	5	10	7	3	10	10	0	10	9	1	8	10	2	9	9	2	10	8	2
6	Build and Sustain	13	7	0	10	10	0	18	2	0	10	9	1	12	7	1	12	5	3	13	7	0	9	9	2	8	10	2	12	7	2	12	7	1
7	Divest	11	8	1	10	8	2	10	8	2	13	7	0	10	8	2	8	8	2	9	9	2	10	8	2	10	7	3	9	10	1	10	8	2
	Total	74	60	6	76	60	5	82	50	11	80	56	6	73	56	11	77	50	12	75	56	9	69	62	9	71	58	14	76	56	9	75	56	13

The average of all respondents, namely Total Strong (S), Moderate (M), and Weak (W) divided by 10 respondents, obtained the average value of each Knowledge Management activity, then obtained the percentage value of each aspect of knowledge management activities such as shown in table 2.

Table 3. The results of the calculation of the percentage of KMD Weight Value for each Knowledge Management Activity

No	Aktivitas	Rata-rata			Bobot			Total Robot	
		S	M	W	S	M	W	Total	Presentase
1	Get	11	8	2	33	16	2	51	85
2	Use	11	8	2	32	17	2	51	84
3	Learn	11	8	2	33	16	2	51	85
4	Contribute	11	8	2	32	17	2	51	85
5	Asses	10	8	2	30	17	2	49	82
6	Build and Sustain	12	7	1	35	15	1	51	85
7	Divest	10	8	2	30	16	2	49	81
	Total Nilai							352	84

Value of Knowledge Management activities in total with the method as shown in table 4 below:

Table 4. Results of the calculation of the overall KMD weight values

No	Aktivitas	Rata-rata			Bobot			Total Robot	
		S	M	W	S	M	W	Total	Presentase
1	Get	11	8	2	33	16	2	35	58.50
2	Use	11	8	2	32	17	2	34	56.33
3	Learn	11	8	2	33	16	2	35	58.33
4	Contribute	11	8	2	32	17	2	34	57.00
5	Asses	10	8	2	30	17	2	32	53.83
6	Build and Sustain	12	7	1	35	15	1	36	60.67
7	Divest	10	8	2	30	16	2	32	53.83
	Total Nilai							239	56.93

Total value	Percentage value
239	56,93%

The total results of his research on Knowledge Management Diagnostic activities averaged 55%. From the calculation of the average percentage of Knowledge Management Diagnostic weight value of 56.93%, it means that it can be seen that in the Graduate School of Education / Education Management. Uninus has been above the average to be able to implement Knowledge Management as mentioned [1]

Table 5. Analysis of Knowledge Management Diagnostic Activities (KMD

1	Get Knowledge Management Activities	Get process surveys get a value of 58.50%, which means that in applying knowledge management it is above the average condition of an organization in implementing Knowledge Management.
2	Get activities in the Knowledge Management System	Use process survey scores 56.33%, which means it is above the average condition of an organization in implementing Knowledge Management.
3	Activities Learn in Knowledge Management	the learning process survey scores 58.33%, which means that it is above the average condition of an organization in implementing Knowledge Management.
4	Contribute activities in Knowledge Manage	Contribute survey process gets a value of 57%, which means it is above the average condition of an organization in implementing Knowledge.
5	Assess Activities in Knowledge Management	survei proses Assess mendapat nilai 53,83% yang artinya masih dibawah rata-rata kondisi suatu organisasi dalam menerapkan Knowledge Management.
6	Build and Sustain Activities in Knowledge Management	survei proses Build and Sustain mendapatkan nilai 60,67% yang artinya sudah di atas rata-rata kondisi suatu organisasi dalam menerapkan Knowledge Management.

| 7 | Aktifitas Divest dalam Knowledge Management | survei Divest mendapatkan nilai 53,83% yang artinya masih dibawah rata-rata kondisi suatu organisasi dalam menerapkan Knowledge Management. |

Determine Alternative Strategies for Implementing Knowledge Management System in IT Helpdesk Application with AHP.

In this study there were 11 (eleven) factors and criteria that influenced strategic alternative priorities from the local scale obtained from the processing of expert respondent data, namely: The value of strategic alternative weights from the criteria: Assess - Usability, Ease, Security, Efficiency, Effective, Build and Sustain - Infrastructure Analysis, factors: Build and Sustain - Build Needs Analysis and Sustain - Application Analysis; Walking factor: Divest - Create a New Application; factor: Divest - Buy Application; factor: Divest - Keep using the running application (Used Current System).

Inconsistency Ratio (CR)

Inconsistency Ratio (CR) or inconsistency ratio of expert respondent data is a parameter used to check whether the pairwise comparison has been done consistently or not. Data inconsistency ratio is considered good if the CR value is ≤ 0.1. To check the inconsistency ratio of the respondent data, the following are shown the inconsistency ratio values for each comparison matrix

Table 6. Inconsistency ratio

No	Value element comparison matrix	Nilai
1	Comparison of elements of Criteria Level 1 based on the Assess criteria in the knowledge management strategy implementation system in the It Helpdesk 0.06 application	0.06
2	Comparison of Level II factor elements based on the target sub-criteria for Assess 0.09	0.09
3	Comparison of Level II factor elements based on the Build and Sustain sub-criteria target	0.06
4	Comparison of Level II factor elements based on the target Divest sub-criteria	0.06

It can be concluded that paired comparisons given by respondents have inconsistency ratios that are smaller than 0.1 so that data calculations are considered to be quite consistent. From the results of the research, The strategy for implementing the Knowledge Management System in the IT Helpdesk application in the Education / Education Management Graduate School is feasible to be implemented into a Knowledge Application System.

Table 7. Alternative comparisons forKMS Implementation Strategies

Goal : Strategi Penerpapan Kwowledge Management SystemIT Helpdesk
Knowledge Discovery System (L: 0,07)
Knowledge Capturing System (L: 0,066)
Knowledge Sharing System (l:0,235)
Knowledge application System (L0,623)

With the condition of the existing infrastructure, of course, the implementation process is not too costly. And to reduce the cost of developing the software can utilize internal IT personnel. The long-term strategies that need to be carried out by the Institution are as follows:

1. Updating information technology that is able to speed up service operations and decision making.
2. Increasing the capability and capacity of information system facilities and infrastructure to anticipate the increasing needs of partners in the future.
3. Conduct socialization to users by conducting "transfer of knowledge" regarding information technology to minimize "human error" and increase user awareness of the development and use of information technology.

In this study focused on the development of a Knowledge Management System to provide and support innovation in service development. IT Helpdesk strategy to achieve the goal of improving the quality of work in existing routine activities based on established management provisions. These strategies include:

1. Coordinate and collaborate between related units in order to support IT Helpdesk activities.
2. Providing data, information and knowledge to support IT Helpdesk activities.
3. Improving and developing IT Helpdesk performance for user satisfaction (Educators and Education staff)
4. Communicate and socialize to users and stakeholders in order to improve the best performance and service for each user.
5. Cooperating with vendors in the context of developing human resources as well as the development of information technology.

6 . Implications of Research Results

From the results of this study, the implications that can be followed are consisting of systems and technology, managerial aspects and advanced research aspects.

1. *Systems and Technology*. In the development of systems and technology to improve the performance of HR based on knowledge management, the Uninus Postgraduate School must make improvements in the field of information technology including system and network infrastructure that supports the implementation of knowledge management systems, because it is required for application implementation. From the results of this study obtained a technical description of the advantages and disadvantages of the helpdesk IT application system. The IT team needs to examine in more depth how the application is implemented with good infrastructure into a Knowledge Management System that is expected to provide added value for the Lecturers and educational staff in terms *Managerial Aspect*s. From the results of this study, it is expected that managerial support and steps can be taken which include the formulation and strategy of implementing the Knowledge Management System in IT Helpdesk applications as a decision and outlined in the form of a decree or regulation as well as an IS / IT strategy
2. *Organizational Aspects*. The implementation of the Knowledge Management System implementation strategy in the IT Helpdesk application is expected to be able to change the work patterns or habits of the organization in general, which previously always depends on the personal Helpdesk to be more independent in dealing with problems related to daily work.
3. *Human Resource Aspects.* The implementation of the Knowledge Management System implementation strategy in the IT Helpdesk application is expected to be a useful tool as a

knowledge base that can provide additional knowledge for HR improvement, especially for Educators (lecturers and educational staff who want to improve themselves through the IT Helpdesk application).

4. *Training Aspects* (Education and Training)/Training. The implementation of the Knowledge Management System implementation strategy in the IT Helpdesk application is expected to be a tool for training / training materials to help facilitate and accelerate helping with problems that might occur, both new and recurring to different users.

5. *Aspects of Advanced Research.* The results of this research have not been standardized, but can also be applied or used and developed in other units or fields or in other companies or institutions. In addition to the support needs, it can also be done for the education sector in the form of training or training. This research can be expanded by adding criteria and factors that determine and add alternative strategies. And this research should be repeated periodically, for example, every 2 years or 3 years to ascertain whether along with the increase in time, the development of the Tiggi College and technological progress methods and validation of the criteria and factors, as well as alternative strategies of this study, are still appropriate or not.

7. Conclusion

Based on the problems, literature studies, review of research, review of research objects and research methodologies in the application of knowledge management systems in the application of IT Helpdesk Online in the Education / Education Management School Graduate School, it can be concluded as follows:

1. Overall, through this research, it can be seen that the implementation of Knowledge Management System in online IT helpdesk applications has been running well, but its use is still not optimal, only limited to knowledge sharing.

2. Overall, the knowledge management diagnostic (KMD) research conducted shows that the readiness has been above average because the results of research on KMD activity were 56.93%. [1] from his research on companies that have implemented knowledge management an average of 55%. This means that from the results of this study Postgraduate Uninus in the application of knowledge management has been above the average.

3. This research was conducted with the knowledge management diagnostic (KMD) model and the data analysis technique used was descriptive analysis techniques and Analytical hierarchical Process (AHP). Information can be obtained on how to compare Knowledge Discovery, Knowledge Capturing, Knowledge Sharing and Knowledge Application comparisons in the IT Helpdesk application. The alternative strategy for implementing Knowledge Management System in IT Helpdesk applications for internal users in Postgraduate Uninus selected is the Knowledge Application System.

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