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Are the World Health Organization's Patient Safety Learning Objectives Still Up-to-Date: A Group Concept Mapping Study

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Background: The World Health Organization (WHO) Patient Safety Curriculum Guide defines learning objectives for patient safety. Current implementation in healthcare education is insufficient. Possible explanations may be obsolescence and/or a shift in needs. We investigated whether overarching topics and specific learning objectives of the WHO Patient Safety Curriculum Guide are still up-to-date, their attributed importance, and their perceived difficulty to achieve.

Methods: Experts on patient safety and medical education from 3 European countries were asked to suggest learning objectives concerning patient safety using group concept mapping. Following 3 successive steps, experts rated ideas by importance and difficulty to achieve. Correlation analyses investigated the relationship between those. Overarching topics of the learning goals (clusters) were identified with multivariate analysis.

Results: A total of 119 statements about intended learning objectives on patient safety were generated, of which 86 remained for sorting and rating. Based on multivariate analyses, 10 overarching topics (clusters) emerged. Both the learning objectives and the overarching topics showed high correspondence with the WHO Patient Safety Curriculum Guide. Strong correlations emerged between importance and difficulty ratings for learning objectives and overarching topics.

Conclusions: The WHO Patient Safety Curriculum Guide's learning goals are still relevant and up-to-date. Remarkably, learning objectives categorized as highly important are also perceived as difficult to achieve. In summary, the insufficient implementation in medical curricula cannot be attributed to the content of the learning goals. The future focus should be on how the WHO learning goals can be implemented in existing curricular courses.

Key Words: patient safety curriculum, WHO Patient Safety Curriculum Guide, group concept mapping (GCM), education, learning objective

(*J Patient Saf* 2022;18: 731–737)

Patient safety is considered one of the top priorities for achieving high quality in health care.^{1–3} Hence, patient safety should be an essential part of education across health professions.

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The study was carried out with the financial support of the European Union EU within the framework of an Interreg V-A–funded project named SafePat. The authors disclose no conflict of interest.

Supplemental digital contents are available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Web site (www.journalpatientsafety.com).

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Accordingly, several initiatives to implement patient safety in the medical curricula exist, such as the World Health Organization (WHO) Patient Safety Curriculum Guide and the Multiprofessional Patient Safety Curriculum Guide.^{3–6} The WHO Patient Safety Curriculum Guide defines 11 overarching topics, with a total of 100 specific learning goals. Despite some successful pilot projects and research efforts, we still face a lack of patient safety learning objectives and content in the curricula in this field.^{7–11} Although the WHO Patient Safety Curriculum Guide was published years ago, it is not well implemented in current curricula.^{3,12} For example, in North America, less than half the medical school have a formal patient safety curriculum.¹⁰ In the European Union, a similar picture is drawn, even though all European Union countries have agreed to include patient safety as a priority in their health strategies in 2012. To foster patient safety, 13 measures have been identified and agreed on Europe-wide. Among these measures, the promotion of education and training of health workers in patient safety or the inclusion of patient safety in education and training in the health professions are named explicitly.¹³ Looking at the implementation level, three-quarters of the 29 participating countries do not provide information on the actual implementation of education and training on patient safety of healthcare professionals. Except in 6 member states, patient safety education is not fully integrated into undergraduate, graduate, and postgraduate education.¹³ Exploring the socioeconomic influence, the implementation of patient safety content into curricula seems to be even more difficult in low-income and middle-income countries: the European Commission stated that, of a total of 27 participating countries, only 4 reported that patient safety had been embedded in the education of health professionals.^{13,14} Furthermore, key factors for a successful patient safety education have been identified.¹¹

This unsatisfying situation raises the question of why the implementation of the patient safety concept in medical schools' curricula is so challenging.¹⁵ One explanation may be found in the topic itself. Some medical educators consider patient safety as something outside clinical knowledge and skills, especially if some of that expertise originates from nonmedical domains (e.g., system thinking and quality improvement).¹⁶ Those who think that patient safety must be part of medical teaching and learning often experience difficulties in integrating the concept into the existing curricula.^{1,3}

Another possible explanation may lie in the content of the learning goals. Specifically, the question arises whether learning objectives that have been defined more than 10 years ago are still relevant from the perspective of the current faculty governance and teaching staff. On the one hand, it seems possible that new learning goals have appeared in the meantime that are not adequately reflected in the WHO curriculum. On the other hand, it is also possible that some learning goals are outdated. These 2 scenarios (which are not mutually exclusive) seem possible because clinical routines change dynamically over time, for example, with the advent of digitalization. A third barrier remains time: The curricular have been filled and overflowing with content, and it is very hard to remove anything from it. Because of this, quality

and safety competes with public health, diversity, inclusion, and many others.

The present study focused on the aspect of the learning goals. Specifically, we investigated whether the learning goals as defined by the WHO curriculum are still relevant from an expert perspective.

Consequently, this study addressed the following research questions:

RQ1: Are the defined overarching topics (clusters) on patient safety in the WHO Curriculum still current?

RQ2: Are the specific learning goals and objectives within the topics still comparable to those defined by the WHO?

Besides the content of the learning objectives, we addressed the implementation of the learning objectives into the medical curriculum. Here, we focused on 2 essential aspects determining the implementation: the importance of the learning goals and how easy/difficult they are to achieve.

RQ3: How important are the identified topics, and how easily can they be achieved?

METHODS

The study was reviewed and approved by the Ethics Committee of the Medical Faculty of the University Hospital RWTH Aachen (EK065/19).

Group concept mapping (GCM) is a consensus-driven approach that combines qualitative data collection with quantitative analysis to guide a group of stakeholders to conceptualize and visually represent ideas and their relationships on an issue.^{17–19} Group concept mapping consists of the following steps: brainstorming of ideas, sorting into thematic groups, and rating. Multivariate statistical techniques, such as multidimensional scaling (MDS) and hierarchical cluster analysis (HCA), then aggregate the participants' individual contributions made during the brainstorming, sorting, and rating to depict and visualize the shared collective perspective of the group on the issue under investigation.

Participants

We requested each partner's participating institution from the Netherlands, Belgium, and Germany to recruit at least 5 experts. We used the smallest possible group of experts from 3 European countries that have substantial differences in healthcare system, for example, in the fields of education and training of nursing staff. In the Netherlands and Belgium,²⁰ the education of nursing personal is academized; in Germany, in turn, this is a vocational training. The implementation of patient safety aspects in the different medical curricula underlies national regulations, for example, in Belgium, which is not the case in Germany. Many other examples exist in the manifold areas of the healthcare system such as training of medical professionals, quality management, and implementation.^{21–23} From our point of view, the diversity of this region represents an example for many other regions in the world. Participants were recruited conveniently and were informed about the study's aim. No prior relationship between participants and researchers was established. In total, 20 experts were invited via email to contribute their experiences and ideas, of which 14 agreed to do so. By consequence, nonparticipation of $n = 6$ can be reported.

Expert details: At the time of data acquisition, 7 of the experts worked in Germany, 4 in Belgium, and 3 in the Netherlands. All 14 experts were active in the fields of clinical medicine, patient safety, and healthcare professional's education, and there is reason to assume that they had been—either directly or indirectly—in contact with the content of the WHO Patient Safety Curriculum before the study. All of them were actively involved in the design

and implementation of patient safety curricula at their sites or institutions.

Nine of them were clinicians and therefore played a dual role, being involved in both academia and clinical practice (“frontliners”). They were clinically active and additionally responsible for curricula development and implementation.

Nine experts had more than 10 years of experience in the clinical field, and 8 had a similar experience in medical education or both. The clinical experts had a background in midwifery, nursing, intensive care medicine, emergency medicine, psychology, and anesthesiology.

Procedure

The brainstorming phase was conducted between July and September 2018 and was followed by the sorting and rating phase until December 2018. Data analysis was conducted from January to July 2019. No previous pilot testing was conducted.

Brainstorming

The aim of this step was to generate ideas. An invitation, including a link to the Web environment, was sent out to the experts. The participants of the GCM study were provided with structured standardized instructions. First, the individual work steps were explained, and the time frame was outlined. The initial step of the GCM was the brainstorming. The instruction for the brainstorming phase was as follows: “Generate statements (short sentences or phrases) that describe intended learning outcomes on patient safety....,” completing the following focus prompt: “An intended learning outcome on patient safety is....”²⁴ This may concern knowledge, skills, or attitudes you expect learners to develop. The WHO patient safety curriculum was not shared during the brainstorming stage to avoid rephrasing it. Every expert was working independently. The participants were asked to provide their brainstorming within 3 weeks. A reminder was sent after 2 weeks. Completion of the online brainstorming lasted approximately 30 minutes per expert. Because of the nature of online data collection, the setting and presence of nonparticipants in which the experts provided their answers were not controlled.

Idea Synthesis

Upon completion of the brainstorming phase, all ideas generated were run through an editing process while preserving the overall integrity of the set of ideas. The purpose of the idea synthesis was to achieve the following characteristics: obtain a list of unique ideas in which only one idea is represented in each statement; ensure that each idea is relevant to the focus prompt; and do not prioritize, select on perceived value, or delete unpopular ideas. The new set of ideas was uploaded back to the online environment for sorting and rating. The order of the ideas was randomized automatically through the system.

Sorting and Rating

The goal of this step is to define and name groups and to rate each idea. The 14 participants were contacted once again via email for coding the data by clustering their ideas according to their coherence in meaning or theme and to define a group name for each cluster of statements. It was allowed to put a single statement in a category. After sorting, the participants were asked to rate the statements using a 1-to-5 scale according to 2 different characteristics: first on importance (1, relatively unimportant; 5, extremely important) and second on easiness/difficulty to achieve (1, very difficult to be achieved; 5, very easy to be achieved). This allowed a conceptual structure to emerge from the data through use of

MDS and HCA of the aggregated individual coding data. A period of 4 weeks was scheduled for sorting and rating.

Analysis

Analysis of the Sorting Data

The analysis of sorting data applied first MDS on the raw participants' grouping of the statements to identify each idea's position in relation to the others in a 2-dimensional space (a point map). The point map calculation generated statistics such as stress index (SI) and bridging value (BV) for each statement. An SI (between 0 and 1) indicates the degree to which the mathematical model as represented by the point map matches the participants' raw sorting. A lower BV indicates that a statement has been more often grouped with statements around it on the map. A higher BV means a statement has been sorted together with statements further apart. A statement with a low BV is considered an anchor for a particular thematic area's content. A higher BV is interpreted typically as a bridge between 2 or more thematic domains.

Group concept mapping includes Ward's agglomerative HCA on the statements' 2-dimensional coordinates to depict more general thematic categories. In a sequence of steps, HCA suggests merging groups of statements, which are checked and verified by the researchers (a cluster map). A group of statements that are close to each other and would indicate a thematic area can be spotted on the map. To make this process more efficient, we applied an HCA on the statements' X-Y coordinates as calculated by MDS. In deciding upon the thematic clusters, we applied the 15–5 heuristics practiced in GCM research.^{18,19} We instructed the software supporting GCM analysis (The Concept System Global MAX, 2016, Ithaca, New York) to produce a sequence of solutions for merging clusters beginning with 15 and arriving at 5 clusters.

Analysis of the Rating Data

Correlation between importance and easy/difficult ratings were calculated both on the statement level and on the cluster level. Significance for correlations was defined as $P < 0.05$.

RESULTS

Brainstorming

A total of 119 statements of intended learning objectives on patient safety were generated. After the synthesis, 86 unique statements

remained for sorting and rating. They were uploaded back to the system and randomized. The synthesis of ideas was carried out as an iterative group process by editing and shortening the list of opinions. Statements that contained more than one thought were split, identical statements and statements that do not address the focus prompts were removed, and the statements were checked for their ratability.

Sorting

Figure 1 shows all 86 statements plotted by the MDS on a 2-dimensional space and their relationships depicted by the distances between statements. The closer the statements to each other, the closer they are in meaning. The SI was 0.32, which was in the acceptable range.¹⁹

The clustering process resulted in a 10-cluster solution (Fig. 1). In terms of content, the resulting clusters in this map represent the outcome of a consensus process; in other words, they reflect an agreement between experts which statements belonged together.

Appendix A, <http://links.lww.com/JPS/A466> provides details of the clusters and their content.

In addition to deciding upon the number of clusters, each cluster was given a name. The following names of the clusters were given (Fig. 1).

The average BV of the majority of the clusters is relatively low, which indicates an agreement between participants about grouping the statements into more general categories. In other words, the GCM analysis revealed an expert consensus concerning 10 overarching topics. For further details, please see Table 1.

Matching of GCM Results With WHO Patient Safety Curriculum Guide

To assess whether the WHO Patient Safety Curriculum Guide is still up-to-date, we compared the learning objectives' content both on the statement level and on the topic (cluster) level. The results of the matching are shown in Appendix A, <http://links.lww.com/JPS/A466>. In short, all topics of the WHO Patient Safety Curriculum Guide corresponded to a GCM topic, with the only exception of infection prevention and control. From 100 learning objectives defined by the WHO, 77 could be replicated in the GCM. Ten of the 23 WHO objectives not reflected in the GCM belonged to the topic infection prevention and control (see Appendix A, <http://links.lww.com/JPS/A466>), which was thus entirely missing in the expert statements.

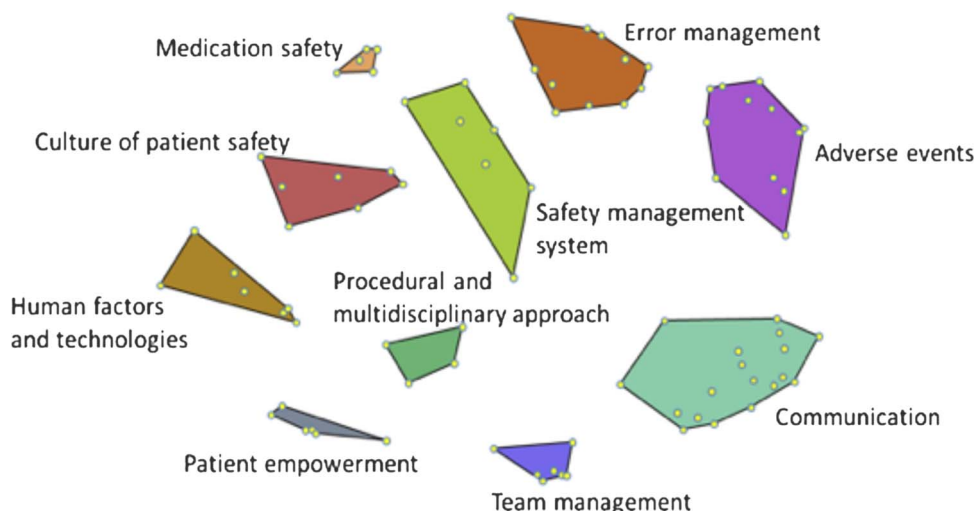


FIGURE 1. Ten-cluster map labeled with an MDS point map representing the position and relationships between the ideas.

TABLE 1. Cluster Names and BVs

Cluster Name	BV
Team management	0.08
Communication	0.18
Error management	0.23
Medication safety	0.24
Adverse events	0.25
Safety management system	0.28
Patient empowerment	0.38
Culture of patient safety	0.43
Human factors and technologies	0.50
Procedural and multidisciplinary approach	0.73

Rating

Average importance ratings for the clusters indicated that the experts generally considered all topics as important. Ratings ranged from 3.13 (culture of patient safety) to 4.20 (communication), with all average ratings being above the middle point of the 5-step Likert scale. A larger span was observed for easy/difficult to achieve, ranging from 2.23 (human factors and technologies) to 4.12 (medication safety). Remarkably, a substantial and significant negative correlation emerged between importance and easy/difficult ratings. This was the case on the statement level ($r = -0.54, P < 0.001$; Fig. 2) and could even be observed with only 10 data pairs on the cluster level ($r = -0.65, P < 0.05$; Fig. 3).

See also Appendix B, <http://links.lww.com/JPS/A466>, for the rating values of each statement on the importance and difficulty to achieve.

DISCUSSION

This study shows that the learning objectives defined by the WHO years ago are overall matching with our identified topics

on the cluster and on the learning objectives levels. Therefore, we consider the WHO learning goals as still relevant. The results are consistent with other such attempts to review the WHO Patient Safety Curriculum Guide. They are consistent with problems discussed in the literature regarding the implementation of curricular elements of patient safety.^{1,3,25-28}

Interestingly, our research shows that most of the WHO learning objectives match our identified topics, except for the area of infection control. We assume that the reason the area infection control is not matching our identified topics is that infection control, using hand hygiene as an example, is already implemented in existing programs that are already well represented in the subject of hygiene or in the surgical subjects.²⁹ In addition, several campaigns to increase awareness on the effects of poor hand hygiene have been implemented by different parties in the last 10 years.²⁹

This could suggest that it is difficult to establish an all-encompassing curriculum for patient safety compared with establishing individual elements that are or could be assigned to already existing disciplines. In the future, it might be worth to consider that the WHO patient safety curriculum could be developed modularly and enhanced with an implementation plan. Therefore, we suggest that overlaps with existing curricula could be pursued with a GCM approach. Specifically, it may be beneficial not to understand patient safety as a separate topic with its own courses, but to implement the patient safety learning objectives into ongoing courses of already existing disciplines. Whether the specific learning goals are still comparable with the ones of the WHO addresses further content for a redevelopment of the WHO curriculum.

The spatial relationship between individual statements and topics is also important in interpreting and for the practical implications of the study's results. For example, although established as individual topics, error management and adverse events are located close to each other, indicating a close conceptual relationship. The same applies to the topics safety management and culture of patient safety.

Issues related to error management and adverse events are often discussed in the literature.^{28,30} Both themes reflect concerns about establishing reliable measures for identifying and

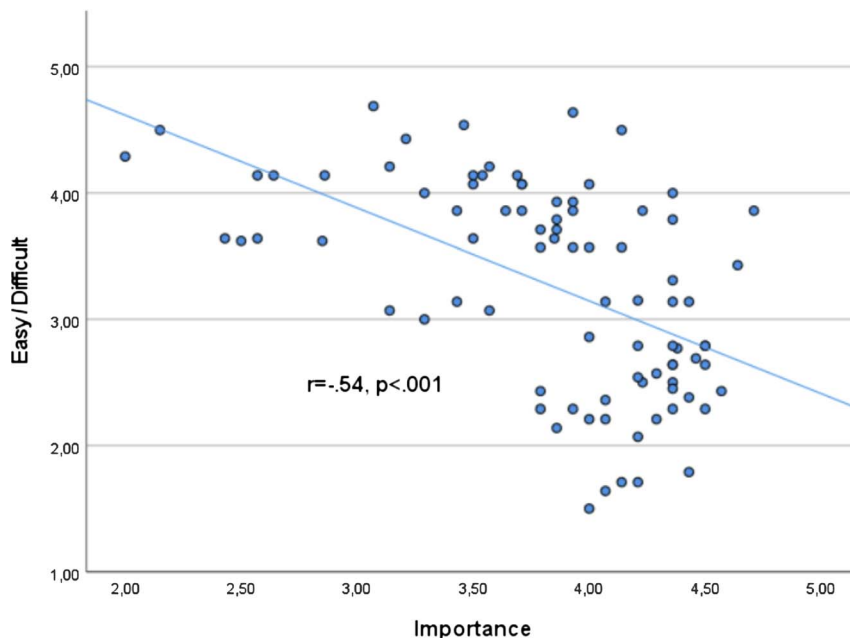


FIGURE 2. Correlation of importance (1, relatively unimportant; 5, extremely important) and easy/difficult (1, very difficult to be achieved; 5, very easy to be achieved) ratings on the statement level.

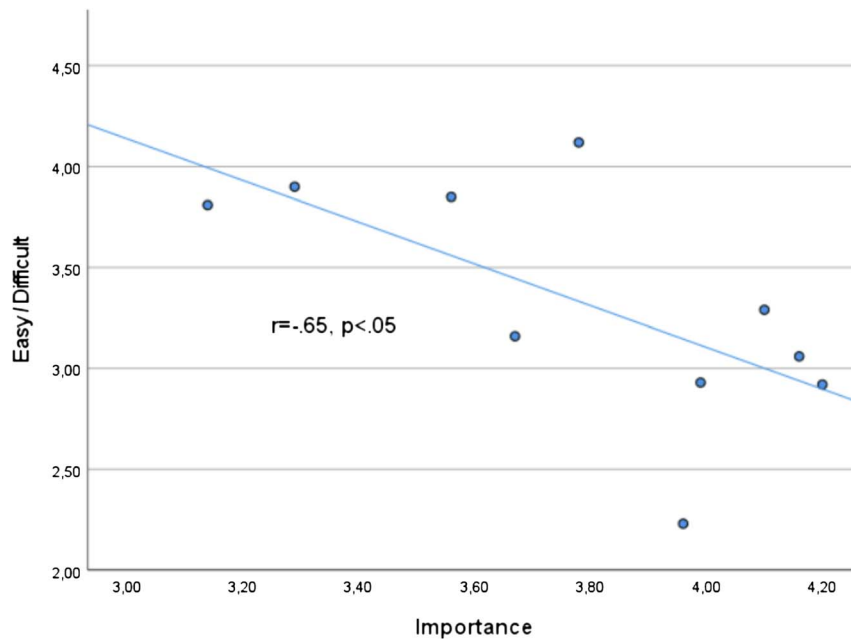


FIGURE 3. Correlation of importance and easy/difficult ratings on the cluster level.

preventing errors and risks, as well as learning from these incidents to minimize as much as possible the chance they occur again in the future.

In line with other similar efforts, the study emphasizes the need to including in the curriculum topics such as management of the healthcare systems and healthcare system culture.^{3,31–35}

Remarkably, medication errors form a separate topic instead of being considered a specific case of error management. Other studies also identified issues of and strategies for managing medication errors.^{3,25,36} We thus conclude that it is justified to treat these 2 topics, also separately in the curriculum.

A noteworthy aspect comes from the ratings of importance and easy/difficult to achieve. Specifically, we found substantial correlations with considerable effect sizes on the statement and on the cluster level. In other words, the more difficult to achieve, the higher was the subjective importance of an objective or cluster. Although this finding should be interpreted with caution because it was solely based on a single data set of 14 experts, this pattern may reflect the well-documented psychological phenomenon of cognitive dissonance reduction.³⁷ Briefly, the latter describes humans' tendency to keep ideas or beliefs consistent with each other to avoid discomfort. It seems conceivable that, for our specific case, a high effort (for objectives that are difficult to achieve) led to the conclusion that this objective must be also sufficiently important. It is important to emphasize that also other interpretations of this finding are possible; nonetheless, it seems plausible that this correlation may result from a causal relationship: aspects of achievability may exert an influence on perceived importance of learning objectives.

Limitations and Future Work

A possible limitation is the size of our expert group. We cannot exclude that a sample of 14 participants does not entirely cover such a complex field. However, meta-analytical studies on GCM projects^{17,19} suggest that this sample size is most likely not an issue for analyzing the sorting data. This is also in line with our experience with GCM studies in healthcare domain.^{38–40}

When interpreting the study results, one must consider the instructions given to the participants. We did not frame our question with any guidelines or standards (e.g., behavior, standard, assessment, possibly conditions and tools, or the well-known SMART criteria for defining learning goals and objectives)^{41,42} because we did not want to affect the idea flow during the brainstorming. This is not a limitation per se but must be taken into account for understanding the different taxonomy levels of the statements. A future study may determine the learning taxonomy levels (behavior) in the description of learning objectives (e.g., knowledge, understanding, application, analysis, synthesis, problem solving in action verbs). Providing guidelines for describing learning objectives would prompt to think about how to align learning outcomes, instructional strategy, and assessment most effectively and efficiently.

Formal training is the first step toward understanding what effective and efficient patient safety means. It is a necessary but not a sufficient condition for designing an integrated patient safety system and culture. Apart from different formal training formats, communities of practices and informal cognitive apprenticeship among colleagues could play an important role in educating medical professionals.⁴ Local context and organizational culture assumptions, known as the hidden curriculum, need to be considered in developing a sustainable patient safety system. Creating a learning culture that emphasizes patient safety should be made high priority.^{43,44}

CONCLUSIONS

The study was aimed to evaluate the relevance and validity of learning objectives on patient safety compared with the WHO Patient Safety Curriculum Guide. Our study confirmed that both aspects are still current. Thus, the insufficient embedding in the medical curriculum cannot be attributed to the content.

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