

## Original Article

# Enhancement of Disaster Management and First Aid Rules for Primary School Teachers in Egypt

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## Abstract

**Background:** Genuine injuries have been reported at schools. Given that schools might not have any trained healthcare providers, teachers will provide first aid to students.

**Objective(s):** To assess knowledge and skills regarding first aid and disaster management among primary school teachers, and evaluate the effectiveness of first aid and disaster management training program on knowledge and skills of those teachers.

**Methods:** Intervention study, in the form of a training program on 43 teachers from two primary schools in Zagazig district, was performed. Evaluation was done through comparing school teachers' first aid and disaster management knowledge and skills before and after intervention by the use of a questionnaire and an observational checklist.

**Results:** The percent of teachers with satisfactory first aid knowledge increased from 7.0% to 46.5% while for satisfactory practice, the percent increased from 4.7% to 51.2% after intervention. For satisfactory disaster management knowledge, the percent increased from 9.3% to 58.1% while for satisfactory disaster management practice, the percent increased from 2.3% to 23.6% after intervention with a statistically significant difference.

**Conclusions:** First-aid and disaster management training program is an effective tool for improving teachers' knowledge and practice.

**Recommendation:** First aid and disaster management training program should be one of the pre-placement and in service training programs for primary school teachers to protect the life of children.

**Key Words:** Disaster management, first aid, school teachers, training program

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## INTRODUCTION

Disaster is a serious interruption of the capacity of a community involving widespread human, material, economic or environmental impacts and losses, which exceed the capacity of the influenced community to cope with using its own resources.<sup>(1)</sup> Each year, schools everywhere throughout the world suffer from disasters, ranging from small to large damaging ones, that seriously affect the operation of the school.<sup>(2)</sup> Injuries among school students are considered as one of the most serious health problems confronting the world today because it can cause lifelong disability or even death. So, first aid and basic life support get to be essential in protecting life and minimizing the consequences of injuries until help is obtained.<sup>(3)</sup> First aid, as the name implies, is the first care given to a victim of an

accident, injury or sudden sickness, before providing advanced medical care. First aid should be aimed to preserve life, promote recovery and prevent exacerbation of the victim's condition. First aider should be able to assess the victim, provide the essential care accordingly and refer afterward to an appropriate medical care as soon as possible.<sup>(4)</sup> It is generally composed of a series of simple and sometimes possibly life-saving techniques, that an individual can be trained to perform with minimal equipment.<sup>(5)</sup> Every year, 150,000 people may die in situations where first aid could have given them a chance to live. Almost, 35% of deaths occur within 5 minutes of an accident while another 54% would occur within 30 minutes. However, giving first aid at the site of the injury can decrease deaths by 20%. According to the World Health Report, the burden of the disease because of injuries has expanded from

about 12% in 1990 to 15% in 2000 and expected to increase to about 20% by 2020.<sup>(6)</sup>

Worldwide, at least 875,000 school students aged below 18 years die because of unintentional injuries per year and more than 95% of these deaths occur in countries with low and middle income levels. More genuine injuries have been reported at schools.<sup>(7)</sup> Children and teachers invest the vast majority of their time inside a school environment, which is therefore the most likely setting for incidents (e.g., asthma attacks, sports injuries, epileptic seizures, etc.) that may require first aid procedures.<sup>(8)</sup> Given that schools might not have any trained healthcare providers on location, teachers would provide first aid to students. Teachers ought to in this manner be trained in first aid procedures and have the capacity to put them into practice. Therefore, not only teachers need to get first aid training during their professional development, but also should update their knowledge and abilities in the light of recent first aid rules.<sup>(9)</sup>

In Egypt, the annual incidence of unintentional injuries sustained by children aged eleven and below represents 19.6% of students in normal school life.<sup>(10)</sup> Despite on the presence of an unsafe school environment, there is no preparation for disasters, training for students and/or their teachers or disaster team. This may lead to doubled or tripled victims of injuries. So, the implementation of teachers' training programs for first aid and disaster management are necessary.

Accordingly, this work aimed to assess knowledge and skills of primary school teachers regarding first aid and disaster management and to evaluate the effectiveness of first aid and disaster management training program on knowledge and skills of primary school teachers.

## METHODS

**Study design:** an intervention study (one group pretest-posttest design) was conducted from November 2015 to April 2016. Data were collected before and 3 months after the intervention.

**Study setting:** The study was conducted at primary schools in Zagazig district, Sharkia Governorate, Egypt.

**Target population and sampling:** Primary school teachers were the target group for this study. The sample size was calculated using Epi info version 6 software program, using the following data; the percent of exposed with outcome (knowledge about first aid after health education) (66.1%), percent of unexposed with outcome (knowledge about first aid before health education) (18.6%) according to the results of other related study,<sup>(10)</sup> two sided confidence level of 95.0% and power of 80.0%, where the total sample size was 40 teachers. Taking into consideration

20% dropouts, the sample was increased to 48 teachers. Only 43 teachers completed the study. The sample was chosen by multistage random sampling technique as follows:

- 1st stage: Zagazig educational district is formed of two educational sectors (east and west). One primary school was randomly selected from each sector.
- 2nd stage: Equal number of primary school teachers was selected randomly from each school.

**Inclusion criteria:** School teachers working in the chosen study settings, available during the period of the study, and willing to take part in the study were incorporated.

**Data collection tools:** Two different tools were utilized to gather data for this study. They were developed in Arabic language by the researchers based on recent literature. The tools were tested for content validity by agreement of four experts in the fields of Community medicine, Emergency Care and Pediatrics to ascertain relevance and completeness. The experts' responses were represented in four points rating score ranging from 4 to 1; 4=strongly relevant, 3= relevant, 2= little relevant, and 1= not relevant. Validity of the questionnaires in view of experts' conclusion were calculated and found to be 93%.

### Tool I: Knowledge Questionnaire

A self-administered questionnaire was used. Questions were developed by the researcher as per the research objectives, the literature review, and previously validated relevant study tools. It was pre-tested on 10 teachers who were excluded from the final analysis. Data obtained from the pre-test were analyzed and accordingly, unclear items were clarified and modified to be easily understood by the participants. Improvements of the questionnaire comprised fundamentally of simplifying the language and shortening sentences to facilitate its comprehension. The final form used was divided into three main sections:

Section A: Socio-demographic characteristics which included age, sex, marital status, residence, years of experience and the subject that is taught by the teacher.

Section B: School teachers' first aid knowledge. It consisted of 46 items to assess general information of first aid (5 items), wound care (3 items), first aid for burns (3 items), insect bites (4 items), animal bites (3 items), fractures and sprains (8 items), epistaxis (3 items), fainting (3 items), epilepsy (4 items), foreign bodies in the ear, nose, or eye (6 items), and chocking and basic life support (4 items). For each question there were 4 choices: the right one, 2 wrong ones and "I don't know". Score "one" was given for each correct answer and "zero" for incorrect answer and "I don't know" ones. The total knowledge was considered satisfactory if the percent score reached

50% or more. Reliability test was done whereas Cronbach's Alpha equals 0.87.

**Section C:** School teachers' disaster management knowledge. It comprised 39 items to evaluate general information regarding disaster definition, causes, and effect (9 items), disaster preparedness (14 items), emergency and evacuation plan (12 items), and impacts of disaster on schools (4 items). For every question there were 4 choices: the correct one, 2 wrong ones and "I don't know". Score "one" was given for each correct answer and "zero" for incorrect answer and "I don't know" ones. The total knowledge was considered satisfactory if the percent score achieved 50% or more. Reliability test was done whereas Cronbach's Alpha equals 0.77.

#### **Tool II: Observational Checklist**

An observational checklist was developed by the investigators based on literature review and was used to assess:

**A-First aid practice:** the researchers used simulated cases with observational checklist to evaluate the first aid practice of teachers. The simulated cases covered eleven scenarios including; wound care, burns, insect bites, animal bites, fractures, sprains, epistaxis, fainting, epilepsy, foreign bodies in the ear, nose, or eye, chocking and basic life support. If the practice was correct, it was scored as "one" while if it was incorrect or not done, it was scored as "zero". The total practice was considered satisfactory if the percent score reached 50% or more. Reliability test was done whereas Cronbach's Alpha equals 0.78.

**B-Disaster management practice:** the researchers used simulated cases with observational checklist to evaluate the disaster management practice of teachers. The simulated cases covered two scenarios. The 1<sup>st</sup> one covered school preparedness and reactions to disasters, and the 2<sup>nd</sup> one covered the evacuation plan. If the practice was correct, it was scored as "one" while if it was incorrect or not done, it was scored as "zero". The total practice was considered satisfactory if the percent score reached 50% or more. Reliability test was done whereas Cronbach's Alpha equals 0.89.

#### **Phases of the research**

**A-Pre-intervention (assessment phase):** It took one month where baseline knowledge and skills regarding first aid and disaster management were assessed using the questionnaire and the observational checklist. Data were collected through a face-to-face interview with the teachers then data were analyzed and used to guide designing the intervention.

**B- Intervention phase (training program):** The objectives of training program were to cover the gaps in the teachers' knowledge and skills about first aid and disaster management. The participants were divided into small groups; each group included five teachers to facilitate the training program application.

The training was conducted by the researchers through direct personal communication in teachers' workplace at the school library. Each group attended eight sessions of the educational program in different days during a one-month period according to a training topics plan (table I). Each session took 60-90 minutes. The training methods included viewing videos, practicing in simulated cases and role plays, and open discussion and answering questions. The content of each session was distributed to the participants after the end of the session in the form of handouts, printed colored pamphlets and booklets on first aid and disaster management to facilitate the process of remembering when needed.

**C- Post intervention (evaluation phase):** The evaluation phase emphasized on estimating the effect of the training program through reassessing school teachers' knowledge and practice of first aid and disaster management three months after the last training session using the same data collection tools.

#### **Statistical analysis**

The collected data was presented and analyzed by using SPSS (Statistical Package for the Social Sciences) version 19.0 and the appropriate statistical tests including McNemar, Chi-square, and correlation co-efficient tests were performed.

#### **Ethical Considerations**

The research protocol was approved by Ethics Committee of the Faculty of Medicine, Zagazig University, Egypt. Official permissions were obtained from the Zagazig Educational Directorate, districts and administrators of the two selected schools. Meetings and discussions were held between the researchers and schools administrators to explain the purpose of the study, as well as to get better cooperation during the implementation phase. The aim of the research was disclosed to the participants. After clarifying the procedures of the study, a written consent from every school teacher to participate in the study was obtained. Participants were informed about their right to reject participation and to withdraw whenever they want without giving reasons and with no consequences. Total confidentiality of any given information was assured.

## **RESULTS**

Regarding the socioeconomic characteristics of studied subjects, most of our participants were males (62.8%), married (69.8%), urban residents (83.7%), with more than ten years experience (53.5%), their mean age was  $32.7 \pm 6.9$  years, and no one received previous training in first aid or disasters management. Regarding first aid knowledge of school teachers before and after the intervention, table II shows that

the majority of them had unsatisfactory knowledge about general first aid information and first aid for wounds, burns, insect bites, animal bites, fractures, epistaxis, fainting, epilepsy, foreign body, choking and basic life support before the intervention. After

implementation of the intervention, the percent of teachers with satisfactory first aid knowledge increased from 7.0% to 46.5% with a statistically significant difference.

**Table (I): Training topics plan**

Session no.	Contents
1 <sup>st</sup>	Wound care First aid for burns First aid for insect or animal bites
2 <sup>nd</sup>	First aid for fractures First aid for sprains
3 <sup>rd</sup>	First aid for epistaxis. Management of foreign bodies in the ear, nose, or eye
4 <sup>th</sup>	First aid for fainting First aid for epilepsy
5 <sup>th</sup>	First aid for choking Basic life support
6 <sup>th</sup>	General information about disasters Disaster preparedness
7 <sup>th</sup>	Emergency and evacuation plan Impact of disaster
8 <sup>th</sup>	In the final session, the materials presented in the past sessions were recounted and summarized through a question-and-answer session.

**Table (II): Teachers' knowledge regarding first aid (before and after the intervention)**

Items	Pre-test (n =43)		Post -test (n =43)		p value
	No.	%	No.	%	
General information of first aid	Satisfactory	4	9.3	13	30.2
	Unsatisfactory	39	90.7	30	69.8
First aid for wounds	Satisfactory	10	23.3	21	48.8
	Unsatisfactory	33	76.7	22	51.2
First aid for burns	Satisfactory	6	14	18	41.9
	Unsatisfactory	37	86	25	58.1
First aid for insect bites	Satisfactory	5	11.6	12	27.9
	Unsatisfactory	38	88.4	31	72.1
First aid for animal bites	Satisfactory	9	20.9	20	46.5
	Unsatisfactory	34	79.1	23	53.5
First aid for fractures and sprains	Satisfactory	5	11.6	28	65.1
	Unsatisfactory	38	88.4	15	34.9
First aid for epistaxis	Satisfactory	10	23.3	22	51.2
	Unsatisfactory	33	76.7	21	48.8
First aid for fainting	Satisfactory	8	15.1	27	62.8
	Unsatisfactory	35	84.9	16	37.2
First aid for epilepsy	Satisfactory	9	20.9	25	58.1
	Unsatisfactory	34	79.1	18	41.9
First aid for foreign body	Satisfactory	11	25.6	20	46.5
	Unsatisfactory	32	74.4	23	53.5
First aid for choking and basic life support	Satisfactory	2	4.7	12	27.9
	Unsatisfactory	41	95.3	31	72.1
Total first aid knowledge	Satisfactory	3	7	20	46.5
	Unsatisfactory	40	93	23	53.5

\* Significant ( $p < 0.05$ )

**Table (III): Teachers' practice regarding first aid (before and after the intervention)**

Items	Pre-test (n =43)		Post -test (n =43)		p value
	No.	%	No.	%	
First aid for wounds	Satisfactory	6	14	30	69.8
	Unsatisfactory	37	86	13	30.2
First aid for burns	Satisfactory	3	7	19	44.2
	Unsatisfactory	40	93	24	55.8
First aid for insect bites	Satisfactory	10	23.3	26	60.5
	Unsatisfactory	33	76.7	17	39.5
First aid for animal bites	Satisfactory	3	7	30	69.8
	Unsatisfactory	40	93	13	30.2
First aid for fractures and sprains	Satisfactory	7	16.3	24	55.8
	Unsatisfactory	36	83.7	19	44.2
First aid for epistaxis	Satisfactory	8	18.6	20	46.5
	Unsatisfactory	35	81.4	23	53.5
First aid for fainting	Satisfactory	11	25.6	26	60.5
	Unsatisfactory	32	74.4	17	39.5
First aid for epilepsy	Satisfactory	6	14	26	60.5
	Unsatisfactory	37	86	17	39.5
First aid for foreign body	Satisfactory	4	9.3	24	55.8
	Unsatisfactory	39	90.7	19	44.2
First aid for chocking and basic life support	Satisfactory	5	11.6	22	51.2
	Unsatisfactory	38	88.4	21	48.8
Total first aid practices	Satisfactory	2	4.7	22	51.2
	Unsatisfactory	41	95.3	21	48.8

\* Significant ( $p < 0.05$ )

Table III illustrates that most of the teachers had unsatisfactory first aid practice before the intervention, while after the intervention, the percent of teachers with satisfactory first aid practice increased from 4.7% to 51.2% with a statistically significant difference. Regarding knowledge about disaster management, table IV shows that before the intervention, more than 80.0% of participants had unsatisfactory knowledge

regarding general information about disasters, and evacuation plan while 76.7% and 63% of participants had unsatisfactory knowledge about preparedness and impact of disasters, respectively. After the intervention, the percent of teachers with satisfactory knowledge about disaster increased significantly by 48.8% ( $p < 0.01$ ).

**Table (IV): Teachers' knowledge regarding disaster (before and after the intervention)**

Items	Pre-test (n =43)		Post -test (n=43)		p value
	No.	%	No.	%	
General information about disaster	Satisfactory	6	14	24	55.8
	Unsatisfactory	37	86	19	44.2
Disaster preparedness	Satisfactory	10	23.3	18	41.9
	Unsatisfactory	33	76.7	25	58.1
Emergency and evacuation plan	Satisfactory	6	14	23	46.5
	Unsatisfactory	37	86	20	53.5
Impact of disaster	Satisfactory	17	39.5	35	81.4
	Unsatisfactory	26	60.5	8	18.6
Total knowledge about disaster	Satisfactory	4	9.3	25	58.1
	Unsatisfactory	39	90.7	18	41.9

\* Significant ( $p < 0.05$ )

Table V demonstrates that about 90% of participants had unsatisfactory practice about disaster preparedness and evacuation, before the intervention. After the intervention, the percent of teachers with satisfactory practice about disaster increased with a high statistically significant difference. Regarding the relation between knowledge and practice of first aid

before and after the intervention, table VI reveals a statistically significant negative correlation between knowledge and practice before the intervention and a statistically significant positive correlation between them after the intervention. A statistically significant positive correlation was also observed between knowledge and practice regarding disaster

management before and after the intervention (table VII). No statistically significant association was observed between age, sex, marital status, residence, years of

experience, and the subject that is taught by the teacher and the total knowledge and total practice scores of first aid and disaster management after the intervention as shown in table VIII.

**Table (5): Teachers' practice regarding disaster (before and after the intervention)**

Items	Pre-test (n=43)		Post -test (n=43)		p value
	No.	%	No.	%	
Disaster preparedness	Satisfactory	4	9.3	24	55.8
	Unsatisfactory	39	90.7	19	44.2
Emergency and evacuation plan	Satisfactory	4	9.3	17	39.5
	Unsatisfactory	39	90.7	26	60.5
Total practice about disaster	Satisfactory	1	2.3	14	32.6
	Unsatisfactory	42	97.7	29	67.4

\* Significant (p<0.05)

**Table (VI): Correlation matrix between knowledge and practice of school teachers regarding first aid before and after the intervention**

Item	(1)	(2)	(3)	(4)
(1) Knowledge about first aid before intervention	r 1	-.340*	.279	-.126
	p .025	.070	.420	
(2) Practice about first aid before intervention	r -.340*	1	-.177	-.044
	p .025	.257	.781	
(3) Knowledge about first aid after intervention	r .279	-.177	1	.496**
	p .070	.257	.001	
(4) Practice about first aid after intervention	r -.126	-.044	.496**	1
	p .420	.781	.001	

\*Correlation is significant at the 0.05 level (2-tailed)

(1) Knowledge about first aid before the intervention

(3) Knowledge about first aid after the intervention

\*\*Correlation is significant at the 0.01 level (2-tailed)

(2) Practice about first aid before the intervention

(4) Practice about first aid after the intervention

**Table (VII): Correlation matrix between knowledge and practice of school teachers regarding disaster management before and after the intervention**

Item	(1)	(2)	(3)	(4)
(1) Knowledge about disaster before the intervention	r 1	.536**	.352*	183
	p .000	.021	.241	
(2) Practice about disaster before the intervention	r .536**	1	.102	294
	p .000	.514	.056	
(3) Knowledge about disaster after the intervention	r .352*	.102	1	.636**
	p .021	.514	.000	
(4) Practice about disaster after the intervention	r .183	.294	.636**	1
	p .241	.056	.000	

\*Correlation is significant at the 0.05 level (2-tailed)

(1) Knowledge about first aid before the intervention

(3) Knowledge about first aid after the intervention

\*\*Correlation is significant at the 0.01 level (2-tailed)

(2) Practice about first aid before the intervention

(4) Practice about first aid after the intervention

## DISCUSSION

Children spend most of their time in school where they are susceptible to various types of disasters and emergencies, which can influence their present and future health and endanger their life. As teachers are the primary caregivers for school children during school hours, they must be able to deal properly with disasters and health emergencies both in normal children, and in children with special health care needs.<sup>(11)</sup> Nonetheless, it was evidenced that most

teachers don't have enough knowledge about first aid and correct practice which raises the need for training in this field.<sup>(12)</sup> So, this study was conducted among primary school teachers to evaluate the effectiveness of a training program on knowledge and practice regarding first aid and disaster management. Concerning personal characteristics, it was found that none of the teachers received previous training courses on first aid and disaster management. This is consistent with a study conducted by Younis and El-Abassy in 2015<sup>(13)</sup> and Mersal and Aly in 2016,<sup>(10)</sup>

who reported that the highest percentage of the school teachers did not attend any first aid training courses. Therefore, it is very important to conduct obligatory first aid education programs at regular intervals through the educational districts, for keeping all school teachers informed and trained.

The present study showed that the highest percentage of primary school teachers had unsatisfactory knowledge about first aid before the intervention, while after the training program, school teachers acquired satisfactory knowledge with a high statistically significant difference. These findings may be explained by lack of training programs on first aid management and emphasize the importance of providing training on first aid for school teachers. Similarly, Li et al., in 2014 conducted a study on effects of pediatric first aid training on preschool teachers. Their results demonstrated that the training significantly improved knowledge levels about first aid among respondents who attended the training course.<sup>(14)</sup>

Regarding first aid practices, the present study results revealed that many unsatisfactory practices were prevalent among respondents before the training program. Meanwhile after implementation of the program, school teachers acquired good first aid practices with a statistically significant difference before and after the intervention. Practical training component is very important to help teachers to be skillful in first aid measures and hence to save lives by recognizing life-threatening emergencies during disaster and emergency situations at any time. This is in agreement with Abdella, et al., in 2015 who conducted an intervention program for the kindergarten teachers about pediatric first aids and noted that before the program, almost all teachers had unsatisfactory skills. In comparison, more than half of them had satisfactory skills immediately after and during follow up of the program with a statistically significance difference.<sup>(15)</sup>

Regarding disaster management, the present study demonstrated that high percentage of teachers had poor knowledge related to general information about disaster, disaster preparedness, emergency and evacuation plan, and impact of disaster before the intervention. There was a highly significant improvement after the intervention, which was proved by the increase in the means of total disaster management knowledge score after the intervention. This is in the same line with Mhaske in 2012 who found that a planned teaching program on knowledge regarding disaster management among secondary school teachers was very effective in increasing the knowledge of teachers on disaster management.<sup>(16)</sup>

Regarding disaster management practice of school teachers before and after the intervention, the findings illustrated that the majority of them had inadequate

practice before the intervention. After the intervention, the percent of school teachers who acquired adequate practice has increased with a statistically significant difference. This is in accordance with Mersal and Aly in 2016 who found that only 1.7% of school teachers in Cairo, Egypt had satisfactory disaster management knowledge and practice before the intervention, which was increased to 61% after the intervention with a statistically significant difference.<sup>(10)</sup> The present findings found no statistically significant association between socio-demographic characteristics of teachers and their knowledge and practice about first aid and disaster management. This is in the same line with Mhaske's findings in 2012 who reported that there was no significant association of pre and posttest knowledge scores with demographic variables.<sup>(16)</sup> On the contrary, this finding is inconsistent with the study by Mersal and Aly in 2016 who found positive correlation between age, previous training and experience of school teachers and between their knowledge and practice regarding first aid and disaster management. In addition, it revealed that females were more knowledgeable and skillful than males regarding first aid and disaster management.<sup>(10)</sup>

Regarding relation between knowledge and practice about first aid management before and after the intervention, a statistically significant negative correlation was found between knowledge and practice before the intervention indicating that satisfactory knowledge is not always accompanied by satisfactory practice and this raises the importance of the practical component of the training program that strengthen the satisfactory practice. The correlation between knowledge and practice turned from negative to positive after the intervention indicating that the intervention did not only focus on delivering knowledge, but also on how to turn this knowledge into practice. Mersal and Aly in 2016 confirmed the positive correlation between knowledge and practice regarding first aid.<sup>(10)</sup>

Regarding relation between knowledge and practice of disaster management, the present study revealed a statistically significant positive correlation between them both before and after the intervention. This is in accordance with Ganpatrao in 2014 who reported moderate correlation between knowledge and self-expressed practices of secondary school teachers regarding disaster management.<sup>(17)</sup>

## CONCLUSION AND RECOMMENDATIONS

There was lack of knowledge and skills among primary school teachers regarding first aid and disaster management before the intervention. The training program was effective in improving their knowledge and skills regarding first aid and disaster management. In addition, the study found no association between

demographic variables of school teachers and their overall knowledge and practice regarding first aid and disaster management. Also, it was found that the correlation between first aid knowledge and practice turned from negative to positive after the intervention emphasizing the importance of the practical component of training program. There was positive correlation between knowledge and practice regarding disaster management both before and after the intervention.

Accordingly, the study recommends that first aid and disaster management training program should be one of the mandatory pre-placement training programs for primary school teachers for the sake of protecting life of children during disasters and emergencies occurring in school environment.

**Conflict of Interest:** The authors declare no conflict of interest.

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