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International Agricultural Concepts through the Eyes of School-Based Agriculture Education Students

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Abstract

As demands to participate in a global economy increase, American students, who have limited knowledge of international agriculture concepts, must be better educated in terms of international awareness and understanding. The purpose of this study was to identify the attitudes, beliefs, understanding, and desired instructional methods of Tennessee school-based agricultural education students in regards to international agriculture. A descriptive questionnaire comprised of 46 items, which measured four constructs, was used to collect data. The summated means of all students for attitudes, beliefs, understanding, and instruction were 3.81 (SD = .46), 3.81 (SD = .57), 3.76 (SD = .51), and 3.76 (SD = .47), respectively. Findings indicated students hold positive attitudes and beliefs toward international agricultural concepts. In an effort to remain a global leader in science and innovation and to meet the needs of the agricultural employers, State Departments of Education should consider providing resources for the development, testing, and implementation of internationalized curricula. If not currently internationalized, other countries should also consider internationalizing their curricula and determine how best to equip students with the skills and knowledge necessary to work in a globalized economy.

Keywords: Globalization, International Agriculture, School-Based Agriculture Education

Introduction/Literature Review

The United States faces the daunting reality that many high school students are not adequately prepared to successfully meet the demands of a global economy (Jackson, 2008). In the early 1900s, agricultural education in the United States was a means to educate farmers on basic production and efficiency, but modern agricultural education must focus on educating producers to solve larger, global issues (Mercier, 2015). As outlined by Mercier (2015), the biggest challenges in the future of agriculture are to "meet future demand for food, conserve and enhance water, soil, and habitat, improve nutrition and public health, and strengthen farms and communities to improve livelihoods," (p.1). According to predictions by the Food and Agriculture Organization of the United Nations (FAO; 2009), today's world population will grow by over a third by 2050. An estimated 9.1 billion humans will inhabit Earth, and worldwide agriculture will be required to raise overall food production by 70% in order to meet the new demands set forth by the projected population (FAO, 2009). Moreover, 70% of the world's population will live in metropolitan areas by 2050 as developing counties rapidly build larger, more populated cities (FAO, 2009). FAO posited the move to metropolitan areas will leave smaller labor forces to work towards an increase in production. Furthermore, FAO suggested the following are prerequisites to global food security: (a) increased investments in developing country agriculture through the public and private sectors; (b) priority given to agricultural research, development, and extension; and (c) effectively functioning global markets.

According to the Center for International Understanding (CIF; 2005), "all fields – from agriculture to auto repair, banking to biotech, medicine to manufacturing, teaching to transportation – are increasingly reliant on international business relationships," (p. 3). Young adults entering the workforce will have to collaborate, sell, and purchase products with people from around the world and compete at a global level to meet future agricultural challenges (CIF, 2005). Acker and Scanes (1998) stated, "international trade is increasingly becoming the economic engine responsible for improving standards of living at home and overseas" (p.61), and agriculture is the driving force for the betterment of our entire world and its increasing population. Agricultural growth around the world directly correlates to reduced poverty (Acker & Scanes, 1998) and the creation of a larger class of people that can afford a better quality of life (FAO, 2009). Agriculture, on the global level, must increase to meet increased demands from the new larger middleclass (FAO, 2009) and "increases in the movement of finance, inputs, output, information, and science across vast geographic areas," (FAO, 2003, p.99).

To meet global demands, investments are needed in education surrounding agriculture – from production to logistics (FAO, 2003). Stewart (2009) purported American students are not being properly prepared to work and thrive in a globalized society. Students in the United States have less knowledge of world issues than students in other industrialized countries (Stewart, 2009). This lack of knowledge places students at a disadvantage for jobs and our country at a disadvantage for economic growth (Stewart, 2009). Furthermore, students in the United States rarely learn the world's most spoken languages and are expected to foster respect for different cultures less than any other industrialized country (Stewart, 2009). Moreover, young Americans lack basic geographical knowledge and struggle to

identify states or countries on a map, and are therefore, unprepared to work on a global scale (Roper, 2002).

In order for the United States to produce graduates that are competitive in the workplace and for schools in the United States to increase their quality of education, globalization must be an active factor in their mission (Acker & Scanes, 1998). To compete in a global economy, the United States educational system should focus on internationalizing the curricula (Stewart, 2009). Stewart (2009) proposed an educational response that appears early in a child's education. Instead of superficial cultural aspects like "food, fun and festivals," (Stewart, 2009, p.185), education should focus on global economic trends, cultural connections and international trade. Congruently, the National Research Council (2009) challenged academic institutions to update curricula to keep pace with the globalization of agriculture and produce graduates capable of addressing issues in the world's systems of food and agriculture. The National Research Council (2009) also indicated how teaching and learning occurs should be improved and opportunities should be provided that allow faculty and students to "learn about the complexities of agriculture and grapple with its evolution and change" (p. 3)

Furthermore, three recent studies support the need for an internationalized school-based agricultural education curriculum in the United States by documenting attitudes and beliefs towards international agricultural concepts (Elliot & Yanik, 2004; Heinert, Lavery, & Roberts, 2014; Radhakrishna, Leite, & Domer, 2003). Elliot and Yanik (2004) found American students did not hold a high value for concepts at the international level. To address this issue, Elliot and Yanik proposed more attention be given to international concerns by incorporating them into curriculum to help student understand the importance of international issues. In Radhakrishna, Leite, and Domer's (2003) study, American students agreed they needed more information concerning international agricultural concepts. These students desired to know more about the world market in order to be prepared and obtain future employment in a more globalized world (Radhakrishna, et al., 2003). Heinert et al. (2014) found attitudes and beliefs among United States students were also positive towards international concepts.

This study seeks to build upon these early works and explore the attitudes, beliefs, understanding, and desired instructional methods of Tennessee school-based agricultural education students in regards to international agriculture. Results from this study could serve as a first step in understanding, establishing, and improving instruction of international agricultural concepts in Tennessee.

Conceptual Framework

Awareness and understanding of international agricultural concepts can be influenced by a number of factors, and with that in mind, Radhakrishna et al.'s (2003) conceptual framework for global awareness and understanding of international agriculture (Figure 1) framed this study.

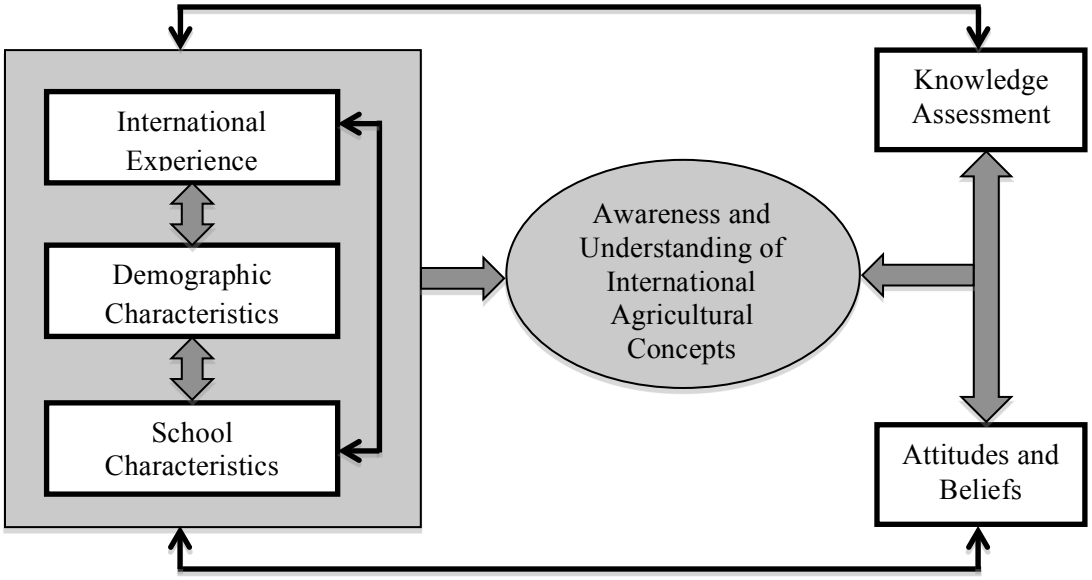

Figure 1. Global awareness and understanding of international agriculture (Radhakrishna, et al., 2003).

Radhakrishna et al. (2003) stated "global awareness and understanding of international agricultural concepts by high school and college students can be linked to several factors — international experience and participation, school characteristics, and demographic characteristics, knowledge assessment, and attitude and beliefs toward international agricultural concepts" (p. 542). Referring to the global illiteracy of even the best of agricultural students as a "crisis" (Radhakrishna et al, 2003, p. 558), Radhakrishna et al. purported the only solution is more education and exposure. Exposure to international agriculture can come through a variety of experiences: "study abroad programs, travel, including intercultural field trips, foreign language skills, hosting foreign exchange students, international foreign youth exchange, and courses in international agriculture" (Radhakrishna et al, 2003, p. 551).

A preliminary study, concerning factors leading to awareness of international agricultural concepts in secondary students, suggested demographics of students and schools had an effect on students' awareness and understanding of international agricultural concepts (Harbstreit & Welton, 1992). While "high school agriculture student awareness about international agriculture in the areas of agricultural products, agricultural policy, geography, and people and cultures is limited," (Harbstreit & Welton, 1992, p. 15) continuing in agricultural classes allows for the student to be exposed to and gain a deeper understanding for the topics. Harbstreit and Welton (1992) found "the longer a student is a part of a high school agricultural program and involved with a supervised occupational experience, awareness about international agriculture increases," (p. 15). Grade point averages, year in secondary school, and involvement in supervised occupational experiences (known as supervised agricultural experiences today) were positively correlated to levels of awareness (Harbstreit & Welton, 1992). Furthermore, attitudes and beliefs play a large role in the understanding and awareness of any concept (Silva, 2015), including those regarding international agricultural. When students feel interest (Hidi, 2001) or even awe (Stewart, 2009) towards a subject, in the form of positive attitudes and beliefs, they

are more likely to retain information in a deeper, fuller capacity (Silva, 2015).

Purpose and Objectives

The purpose of this study was to identify the attitudes, beliefs, understanding, and desired instructional methods of Tennessee school-based agricultural education students in regards to international agriculture. The objectives of the study were to:

1. Determine the attitudes of students toward international agricultural concepts.
2. Determine the beliefs of students toward international agricultural concepts.
3. Determine student's understanding of international agricultural concepts.
4. Determine student's views of desired instructional methods for learning international agricultural concepts.
5. Determine if attitudes, beliefs, understanding, and desired instruction methods toward international agriculture concepts differ based on gender and school.

Methods

This descriptive study utilized an instrument that Radhakrishna et al. (2003) adapted from Elliot and Yanik (2002). The instrument was comprised of 46 items, which measured four constructs and used a five-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*) and contained demographic questions. Reliability of the constructs were assessed post-hoc for this study: attitudes (14 items, α =.83), understanding (6 items, .78), attitudes toward instruction (13 items, .86), and beliefs (13 items, α =.78).

Three school-based agricultural education programs were purposively selected to participate in this study based on the size of the school and their rural or urban location. The researchers wanted to represent both rural and urban schools in Tennessee. School 1 and 2 have approximately 2000 students each and are located in urban communities. The school-based agricultural education programs at both school 1 and 2 are comprised of two agriculture teachers. Whereas, school 3 has approximately 300 students and is located within a rural community with only one agriculture teacher. The school-based agricultural education program at school 1 consisted of 105 students, and thirty-eight of the students participated in the study. School 2 had 128 students in their school-based agricultural education program, and 61 of the students participated in the study. School 3 had 75 students in their school-based agricultural program, and 24 of the students participated in the study. The total response rate for this study was 40%. The lack of returned parental consent forms prevented some of the students from participating. The informed consent forms were delivered in person to an agriculture teacher at each of the selected schools. The agriculture teacher introduced the potential student participants to the opportunity to participate in the study and passed out the informed consent forms. The students took the consent forms home in order to seek their parent's permission to participate in the study. If the student was 18 years of age, parental consent was not required per Institutional Review Board requirements. After each agriculture teacher collected the informed consent forms, the lead researcher or the high school agriculture teacher administered the pen and paper instrument. The data were analyzed using SPSS 22, and descriptive statistics were reported.

Demographic information on the students surveyed are presented in Table 1. The majority of the students surveyed were males (54.5%) and located in a rural location (72.6%). Despite a large percentage of

students attending school in a rural location, only 35.5% of the students lived on a farm.

Table 1
Demographic Profile of Students

Variable	*f*	%
Gender		
Female	55	45.5
Male	66	54.5
Class Standing		
Freshman	37	30.1
Sophomore	31	25.2
Junior	24	19.5
Senior	29	23.6
School Location		
Rural	85	72.6
Urban	32	27.4
Live on Farm		
Yes	43	35.5
No	78	64.5

Results

Objective 1: Determine the attitudes of students toward international agricultural concepts.

The attitudes of students toward international agricultural concepts were generally agreeable and positive, and majority agreement was recorded on all attitude items (Table 2). The summated mean for attitudes was 3.81 (*SD* = 0.46), and 89% of students agreed or strongly agreed with the statement, *I should understand about agriculture and its importance to the world economy.* However 12.2% and 11.4% of students disagreed or strongly disagreed with the statements *I should know more about the cultures of other countries* and *learning more about agriculture in other countries will help me understand future changes in world agriculture,* respectively.

Table 2
Attitudes Toward International Agricultural Concepts

Item	Strongly Disagree %	Disagree %	Neither Agree or Disagree %	Agree %	Strongly Agree %
I should understand about agriculture and its importance to the world economy.	0.0	0.0	10.6	43.9	45.1
I should understand more about the differences between developing and developed countries.	0.8	4.1	41.5	42.3	11.4
I should know more about other countries as markets for U.S. agricultural products.	1.6	4.9	35.0	47.2	11.4
I should have a better understanding about how politics affect world agriculture.	1.6	6.5	26.8	45.5	19.5
I should know more about the cultures of other countries.	3.3	8.9	32.5	40.7	14.6
I should understand how the culture of other countries impact agriculture in those countries.	1.6	6.5	30.1	48.0	13.8
Learning more about agriculture in other countries will help me understand future changes in world agriculture.	4.1	7.3	22.0	50.4	16.3
I need to know more about world agriculture.	1.6	1.6	32.5	46.3	17.9
I should know more about how world events affect local agriculture in my community.	0.0	2.4	22.0	55.3	20.3
I should know more about how world agriculture affects food prices in the local grocery store.	0.0	1.6	18.0	53.3	27.0
Marketing U.S. agricultural products to other countries will help the U.S. economy.	2.4	4.9	36.6	39.8	16.3
Coming changes in world agriculture will have some impact on me in the future.	0.0	5.7	17.1	53.7	23.6
World events have some impact on agriculture in my community.	0.0	5.7	24.4	51.2	18.7

Objective 2: Determine the beliefs of students toward international agricultural concepts.

A majority of students provided positive agreeance with statements regarding international agricultural concepts (Table 3). The statements below yielded a summated mean of 3.81 (*SD* = 0.57). A majority of students agreed or strongly agreed (88.5%) *agriculture involves more than farming.* When questioned about where they could learn more about world agriculture, students predicted they would be exposed to concepts, indicated by agreeing or strongly agreeing, through fairs and trade shows (74.4%), audio-visual materials (72.9%), and guest speakers (62.5%). While these items could be considered as supplements to classroom teachings, they are also seen as opportunities for students to see real-world examples outside of the classroom

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Table 3

Beliefs Towards International Agricultural Concepts

Items	Strongly Disagree %	Disagree %	Neither Agree or Disagree %	Agree %	Strongly Agree %
Agriculture involves more than farming.	0.8	2.5	8.2	28.7	59.8
Natural disasters affect the price of food in my local grocery store.	0.8	2.5	22.1	45.9	28.7
The U.S. should help other countries with food aid in times of famine.	3.3	4.9	30.3	36.9	24.6
U.S. trade partners (customers) help U.S. agriculture.	1.6	4.1	24.6	50.0	19.7
Competition with other producers worldwide help keep food prices rather reasonable.	4.1	6.6	30.6	42.1	16.5
An understanding of other cultures will help U.S. food producers to market their products abroad.	1.7	4.1	40.5	42.1	11.6
An understanding of international political issues will help U.S. producers market their products abroad.	1.7	5.8	40.0	43.3	9.2
That guest speakers who are knowledgeable regarding international events would help me learn more about world agriculture	0.8	5.8	30.8	45.0	17.5
That variety of audio-visual materials (web-sites, slides, videos, films, etc.) would help me learn more about world agriculture.	2.5	3.3	22.3	51.2	20.7
That computer programs that are internationally oriented would help me learn more about world agriculture.	2.5	7.4	32.2	39.7	18.2
That I can learn about world agriculture from watching selected television programs.	4.1	4.1	28.9	46.3	16.5

That I can learn about world agriculture from listening to selected radio programs.	6.6	9.1	43.0	30.6	10.7
That I can learn about world agriculture from attending events such as fairs or trade shows	0.8	1.7	23.1	44.6	29.8

Objective 3: Determine the understanding of geography in relation to international agricultural concepts in students.

The summated mean for understanding geography mirrored the generally agreeableness of prior constructs (*M* = 3.76; *SD* = .51; See Table 4). However, most students were more concerned with geography only related to the United States – 78.7% and 73% of students respectively agreed or strongly agreed with a need to understand *major regions in the United States* and *location of states and major regions in the United States.* The average percentage of students agreeing or strongly agreeing to the importance of geography related to *the seven continents in the world, locations of countries in the world, major waterways used in shipping agricultural products,* and *counties that are the most densely populated* was 62.7%.

Table 4
Understanding of Geography in Relation to International Agricultural Concepts

Items	Strongly Disagree %	Disagree %	Neither Agree or Disagree %	Agree %	Strongly Agree %
To help me understand agriculture from a global perspective, I should have a basic understanding of the United States and world geography, such as:					
Major regions in the United States.	2.5	0.8	18.0	54.9	23.8
Location of states and major regions in the United States.	0.0	4.1	23.0	49.2	23.8
The seven continents in the world.	1.7	1.7	31.4	41.3	24.0
Location of countries in the world.	2.5	2.5	32.0	49.2	13.9
Major waterways used in shipping agricultural products.	0.8	3.3	26.2	50.8	18.9
Countries that are the most densely populated.	4.1	3.3	39.8	38.2	14.6

Objective 4: Determine student's views in desired instructional methods in learning international agricultural concepts.

When asked about more specific instructional topics, students agreed on the propositions in Table 5 with an average score of 3.76 (*SD* = 0.47; See Table 5). Instruction on *major agriculture products produced in my country,* and *global agriculture and the effects on American agriculture* yielded the most agreeable results with 70.5% and 69.1%, respectively, agreeing and strongly agreeing. In addition, 55.8 % of students agreed or strongly agreed that lessons in international agriculture would *help me function better as citizens in a global society.*

Table 5
Attitudes Towards Instruction for Understanding International Agricultural Concepts

Items	Strongly Disagree %	Disagree %	Neither Agree or Disagree %	Agree %	Strongly Agree %
I am more likely to understand global agriculture if given instruction about:					
Major agricultural products that are produced in my country.	0.8	5.7	22.8	51.6	18.9
What happens to local products once they leave the community?	0.0	4.2	28.3	46.7	20.8
How the U.S. works with other countries on economic issues	3.3	4.1	33.1	45.5	14.0
How the U.S. works with other countries on political issues.	1.7	10.0	35.0	38.3	15.0
How the U.S. works with other countries on humanitarian issues.	2.5	4.1	30.3	49.2	13.9
Global agriculture and the effects on American agriculture.	0.0	4.9	26.0	48.0	21.1
A proposed set of lessons on international issues should:					
Not be too complex for me.	0.8	6.5	31.7	42.3	18.7
Provide me with an appreciation of the interdependency of nations around the world.	1.6	4.9	36.1	45.9	11.5
Prepare me for future changes in global agriculture.	0.8	0.0	23.1	54.5	21.5
Provide an opportunity to interact with people in other parts of the world	1.6	6.6	31.1	41.8	18.9
Help me understand global agricultural marketing systems.	1.6	3.3	26.2	53.3	15.6
Help me function better as citizens in a global society.	4.1	5.7	34.4	44.3	11.5
Prepare me for future changes in global agriculture.	1.6	2.5	27.0	47.5	21.3

Objective 5: Determine if attitudes, beliefs, understanding, and desired instruction methods toward international agricultural concepts differ based on gender and school.

Variance of attitudes, beliefs, understanding and instruction among schools and gender showed slight trends but no significant differences. Among schools, School 1 showed higher summated means among attitudes, beliefs, understanding and instruction. School 2 and School 3 were tied or within 0.03 points of each other on 75% of the constructs. As far as gender, similar results were recorded. Females achieved a slightly higher summated mean on three of the four constructs and tied on the other construct with males.

Table 6
Variance of Attitudes, Beliefs, Understanding and Instruction Among Schools

	School 1		School 2		School 3	
	M	*SD*	*M*	*SD*	*M*	*SD*
Attitudes	3.88	0.35	3.77	0.49	3.80	0.52
Beliefs	3.91	0.42	3.70	0.50	3.70	0.50
Understanding	3.91	0.56	3.76	0.61	3.78	0.48
Instruction	3.83	0.42	3.76	0.56	3.64	0.49

Note. Scale was 1 = *strongly disagree* to 5 = *strongly agree*.

Table 7
Variance of Attitudes, Beliefs, Understanding and Instruction Among Gender

	Females		Males	
	M	*SD*	*M*	*SD*
Attitudes	3.83	0.45	3.79	0.47
Beliefs	3.82	0.43	3.72	0.50
Understanding	3.83	0.57	3.80	0.57
Instruction	3.72	0.46	3.72	0.55

Note. Scale was 1 = *strongly disagree* to 5 = *strongly agree*.

Conclusions

The purpose of this study was to identify the attitudes and beliefs of school-based agricultural education students in Tennessee in regards to international agriculture. We found the generally agreeable and positive beliefs and attitudes were consistent with prior research (Yanik & Elliot, 2002; Radhakrishna, et al., 2003; Heinert, Lavery & Roberts, 2014.). When surveyed about their general attitude toward international agricultural concepts, a majority of students agreed or strongly agreed with all attitude items, which reinforces both Elliot and Yanik (2002, 2004) and Radhakrishna et al. (2003).

In addition, students portrayed agreeableness in their beliefs of the importance of international agricultural concepts. Students conveyed positive responses in both beliefs of international agriculture as well as where they may encounter international agriculture. Furthermore, in the case of geographical understanding, students tended to be overwhelmingly positive about the United States' geographical features, while they were only generally interested in global geography. This is consistent with Roper (2002), who suggests United States' students are lacking in global perspectives.

Finally, students provided insight into their desired instructional methods in learning international agricultural concepts. This information may be valuable to the development of appropriate curricula in the future. Students believed lessons should show how the United States works with other countries and how global agriculture effects the United States, which may be a way of making the concepts more concrete rather than abstract for the students. Students indicated with strong agreeableness that they wish to see how countries, including their own, work together to overcome agricultural issues.

In regards to differences among school characteristics and gender, slight difference were found. Demographically, School 1 and School 2 were more similar in the fact that they were large urban schools, while School 3 was a small rural school;

however, School 2 and School 3 achieved more similar results. Differences in gender seemed negligible as well. While females achieved a higher summated score for three of the four constructs, the difference was minimal. This suggests negligible or no differences exist in attitudes, beliefs, understanding, and instruction in regards to international agriculture concepts among the students in this study.

Recommendations for Practice

State Departments of Education should consider providing resources for the development, testing, and implementation of internationalized curricula. Curriculum writers should use information from this study and others to gather concepts that should be included in school-based agricultural education curricula. Educators should work towards collaboration between school-based agricultural education, agricultural companies and organizations, and higher education to enhance the school-based agricultural education student experience in regards to international agricultural attitudes, beliefs, understanding, and instruction.

Furthermore, if not currently internationalized, other countries should consider internationalizing their curricula and determine how best to equip students with the skills and knowledge necessary to work in a globalized economy. Additionally, curriculum writers in the United States should look at curricula from other counties to understand which concepts are being taught.

Recommendations for Further Research

Further research should be conducted to determine school-based agricultural education teachers' perceptions of globalized curricula and their content knowledge and pedagogical needs related to international agricultural concepts. Research should be conducted to identify specific concepts that should be included in an internationalized school-based agricultural education curricula. Furthermore, replication of this study should be done in order to represent other regions of the United States and investigation of how and if other countries internationalize their curricula would be beneficial.

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