

Institute for Christian Teaching
Education Department of Seventh-day Adventists

**THE CONCEPT OF ORIGINS AMONG STUDENTS IN
ADVENTIST SECONDARY SCHOOL
IN ARGENTINA AND MEXICO:
FINDINGS, IMPLICATIONS, AND RECOMENDATIONS**

by

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Introduction

Relevance

Evolutionism surrounds us. It appears on TV documentaries, films, newspapers, textbooks and museum. Because of that, our students face a strong ideological tension for which we believe they are not being adequately prepared. According to Canale, “the issue of evolution is one of the many intellectual challenges Adventists have to meet as they pass their beliefs from one generation to the next and share the Three Angels’ Messages with the world. Intellectual challenges must be met with intellectual weapons and solutions” (2005, p. 160). As Adventist professors we have “the opportunity to have a profound influence on our students to develop a worldview according to the beliefs taught in Scripture, and to continually test other worldview beliefs against the Scriptures” (Donkor, 2006, p. 115).

Since the theory of evolution seriously attacks the Bible, we think that it is highly important to spend time and effort elaborating a proper methodology that assures the meaningful learning of the Christian biblical concept of origins of nature and man.

Objectives

The objective of this study was to evaluate the degree of learning of the concept of origins by students, who have studied in primary and secondary within the Adventist system, in order to know the impact that our education is producing in this area. The main question we sought to answer was, Is there a relation between the number of years of study within the Adventist educational system and learning of the concept of origins?

Our hope was to see an increase in the understanding of the traditional Adventist belief in origins as the students spend more years within the church’s educational system. This study was designed to test that hypothesis.

Additionally, we sought to discover which points are well established and what deficiencies need to be addressed.

The final goal of this diagnosis is to serve as a foundation to improve the quality of the learning of the Biblical concept of origins.

Methodology

Two diagnostic research tools have been developed. One was developed between 2003 and 2004 in the Division of Humanities at Universidad Adventista del Plata (UAP, Argentina) and the Geoscience Research Institute (South America Division branch), through an anonymous survey returned by 738 students in 17 Adventist Secondary Schools in Argentina.

The same research was replicated during 2008 by the School of Education at Universidad Linda Vista (ULV, Chiapas, Mexico), with 759 student respondents from 19 Adventist secondary schools in southern Mexico. The students were 7th and 12th graders and were grouped in 4 categories according to the variable “years of studies within the Adventist system”: up to 2 years, between 3 and 6 years, 7 and 10 years, and 11 or more years.

	ARGENTINA	MEXICO
Up to 2 years within the system	125 students	301 students
Between 3 and 6 years	253 students	200 students
Between 7 and 10 years	253 students	188 students
11 or more years	125 students	70 students
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Total	738 students	759 students
Total number of students in the study		1497 students

Findings

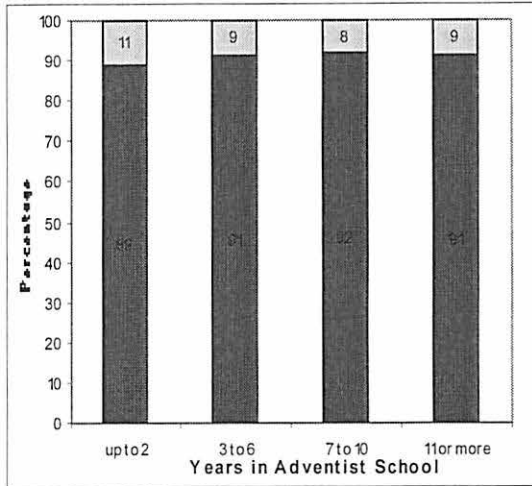
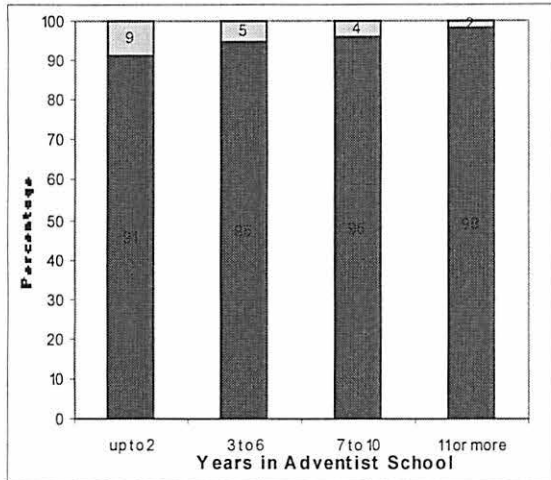
The results are shown in percentages, since the number of students is not the same in each category. The questions of the questionnaire, which the students had to answer by marking true or false, were grouped in 6 topics: 1. Belief in the historicity of the story of Genesis. 2. The creation of man. 3. The creation of the plants and animals. 4. When and how did plants and animals appear on Earth? 5. The dinosaur issue and 6. Variation in species or speciation.

1. Belief in the historicity of the story of Genesis

Question: *The biblical book of Genesis, where we read the story of the creation of living beings by God in six days, tells us what really happened.*

	ARGENTINA			
	2 years	3-6	7-10	11 or more
True	91	95	96	98
False	9	5	4	2

	MEXICO			
	2 years	3-6	7-10	11 or more
True	89	91	92	91
False	11	9	8	9

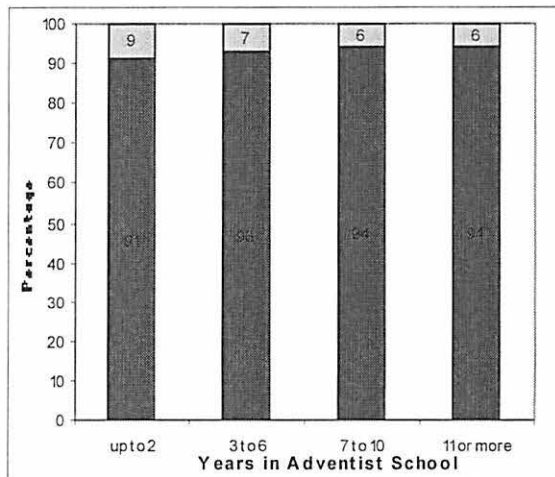
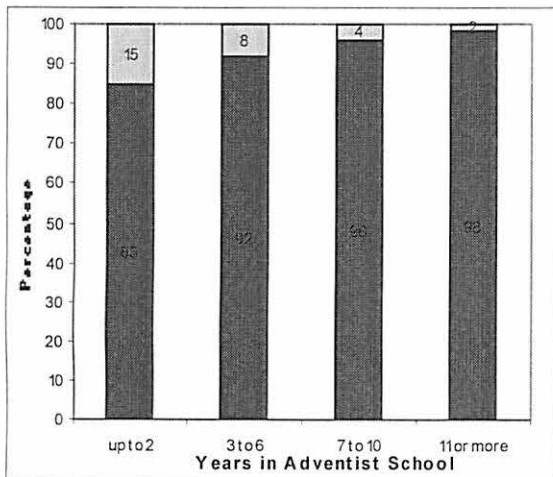


2. The creation of man

Question: *Man was created directly by God from the earth.*

	ARGENTINA			
	2 years	3-6	7-10	11 or more
T	85	92	96	98
F	15	8	4	2

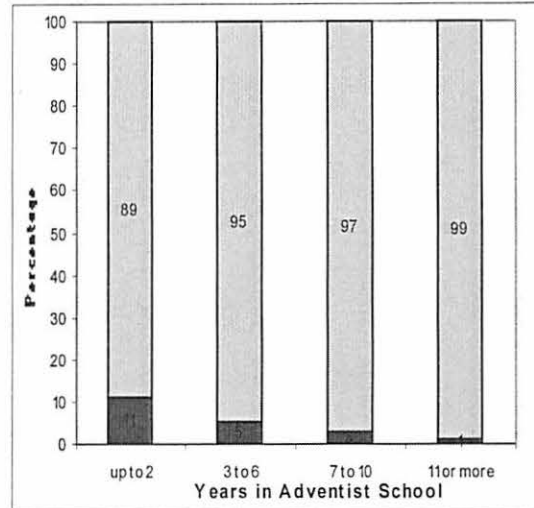
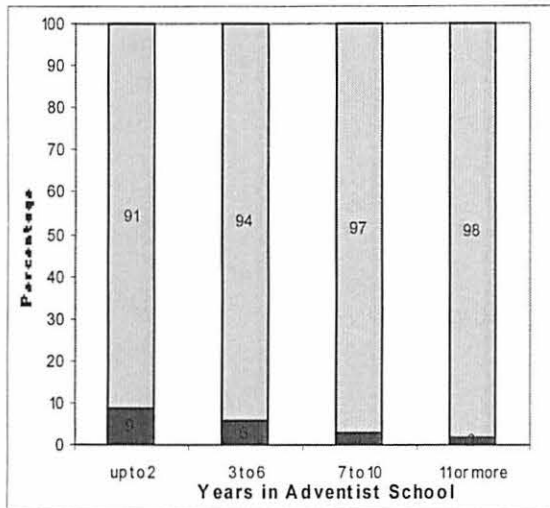
	MEXICO			
	2 years	3-6	7-10	11 or more
T	91	93	94	94
F	9	7	6	6



Question: *Man was not created by God; he has evolved from the monkeys.*

		ARGENTINA			
		2 years	3-6	7-10	11 or more
T		9	6	3	2
F		91	94	97	98

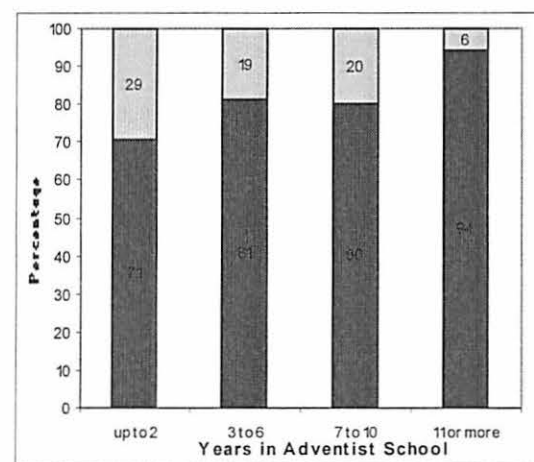
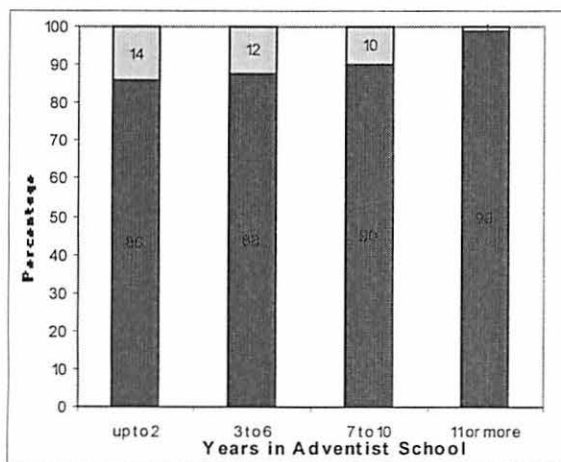
		MEXICO			
		2 years	3-6	7-10	11 or more
T		11	5	3	1
F		89	95	97	99



Question: *The first humans were physically greater and stronger than the contemporary ones.*

		ARGENTINA			
		2 years	3-6	7-10	11 or more
T		86	88	90	99
F		14	12	10	1

		MEXICO			
		2 years	3-6	7-10	11 or more
T		71	81	80	94
F		29	19	20	6

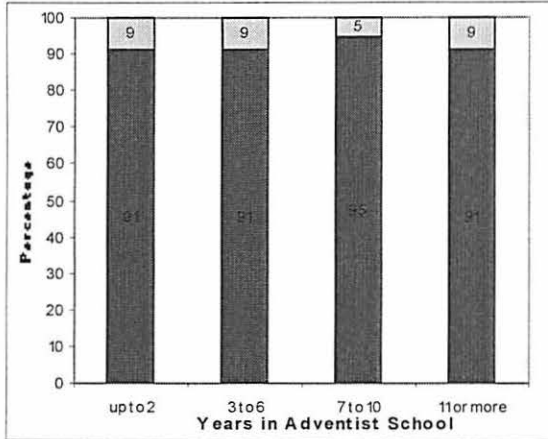


As we look at the responses to the question regarding whether the first humans were physically superior to modern man, we observe that school has a small influence.

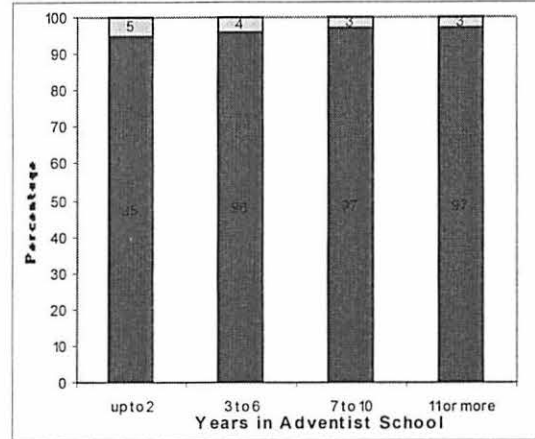
3. The creation of the plants and animals

Question: *Plants and animals were created by God in the beginning of the world.*

		ARGENTINA			
		2 years	3-6	7-10	11 or more
T		91	91	95	91
F		9	9	5	9

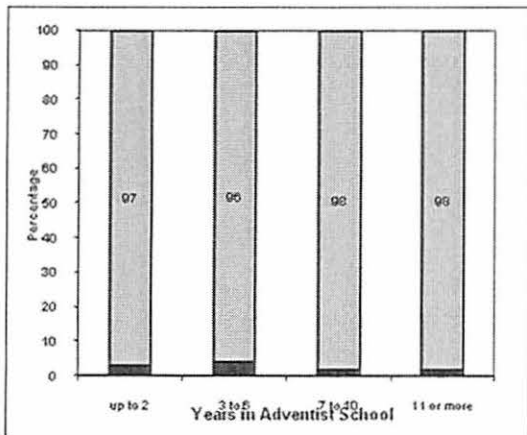


		MEXICO			
		2 years	3-6	7-10	11 or more
T		95	96	97	97
F		5	4	3	3

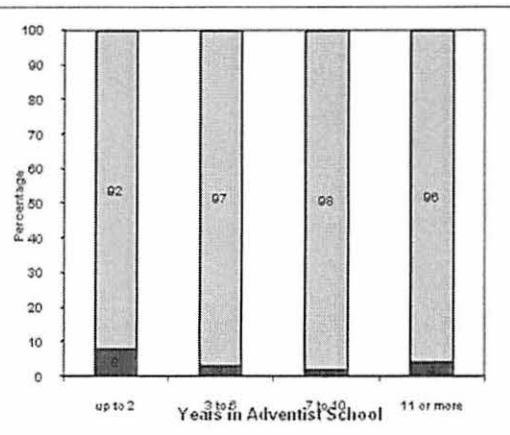


Question: *Plants and animals have developed by chance.*

		ARGENTINA			
		2 years	3-6	7-10	11 or more
T		3	4	2	2
F		97	96	98	98



		MEXICO			
		2 years	3-6	7-10	11 or more
T		8	3	2	4
F		92	97	98	96

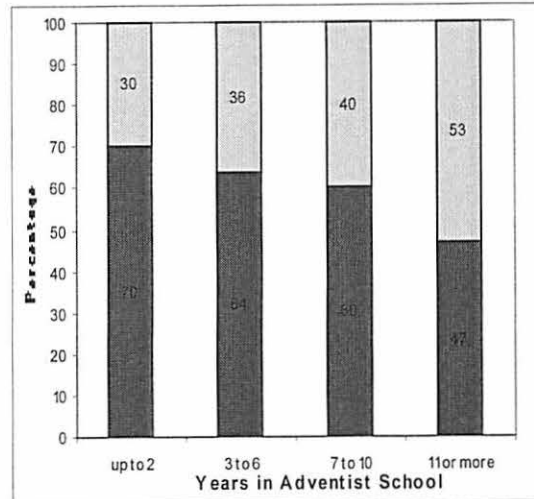
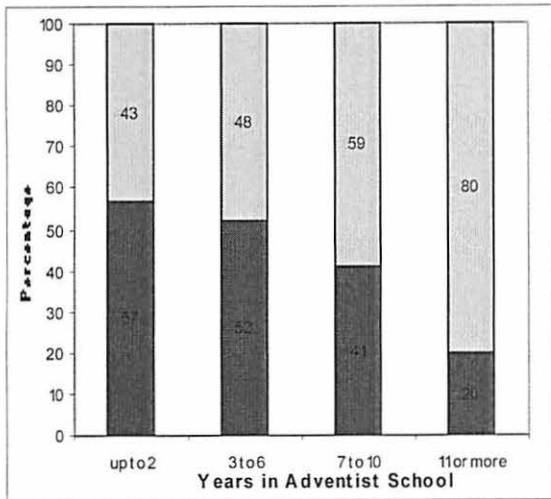


The answers on the first 3 topics show that the respondents adhere to the biblical worldview. We see that students enter school with these concepts in place, and therefore schools seem to exert very little influence in this regard. But serious problems are observed in the following three topics.

4. When and how did plants and animals appear on Earth?

Question: *Plants and animals have existed on planet Earth for millions of years.*

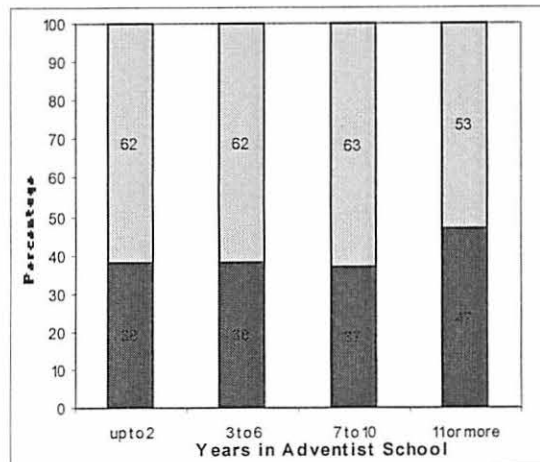
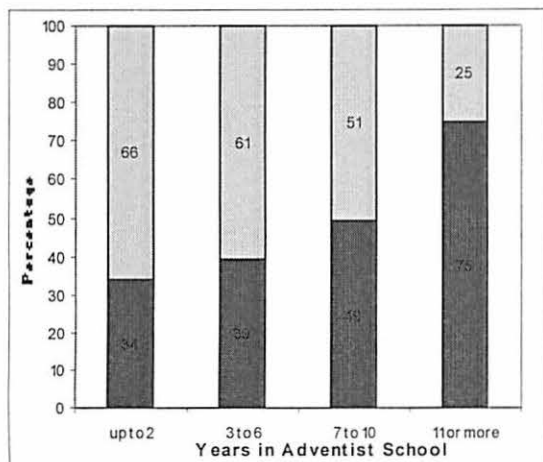
	ARGENTINA				MEXICO			
	2 years	3-6	7-10	11 or more	2 years	3-6	7-10	11 or more
T	57	52	41	20	70	64	60	47
F	43	48	59	80	30	36	40	53



Question: *Plants and animals have existed on planet Earth for a few thousand years.*

	ARGENTINA				MEXICO			
	2 years	3-6	7-10	11 or more	2 years	3-6	7-10	11 or more
T	34	39	49	75	38	38	37	47
F	66	61	51	25	62	62	63	53

*53 students indicated that they had preferred the option "I don't know".

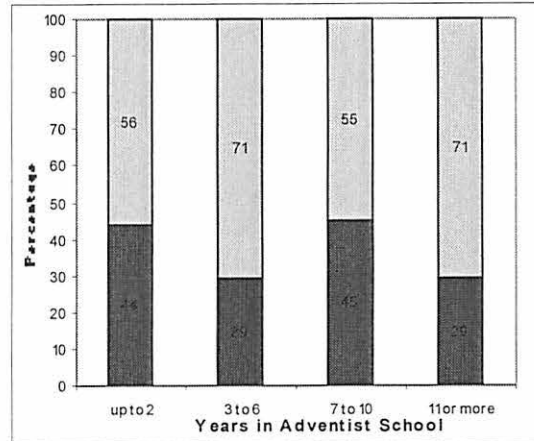
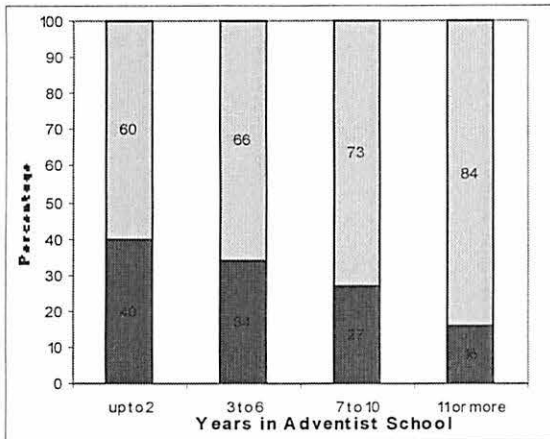


Question: *It is not known when the first plants and animals appeared on the Earth.*

		ARGENTINA			
		2 years	3-6	7-10	11 or more
T		40	34	27	16
F		60	66	73	84

		MEXICO*			
		2 years	3-6	7-10	11 or more
T		44	29	45	29
F		56	71	55	71

*57 students indicated that they had preferred the option "I don't know".

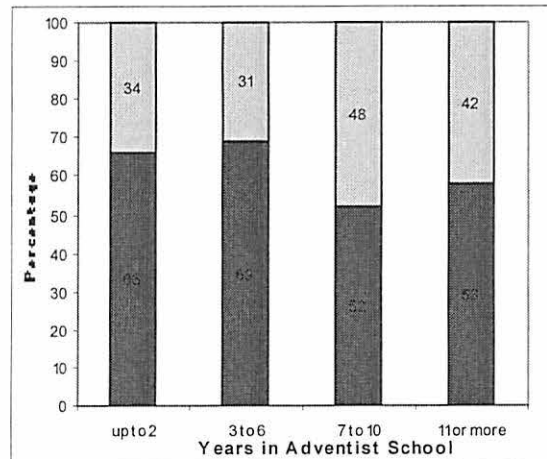
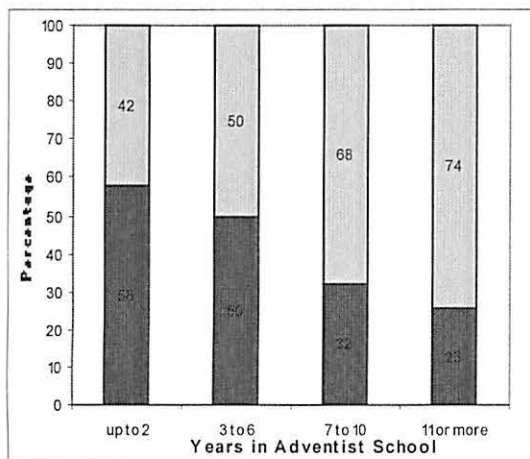


Question: *Plants and animals have evolved throughout millions of years.*

		ARGENTINA			
		2 years	3-6	7-10	11 or more
T		58	50	32	26
F		42	50	68	74

		MEXICO			
		2 years	3-6	7-10	11 or more
T		66	69	52	58
F		34	31	48	42

*40 students indicated that they had preferred the option "I don't know".

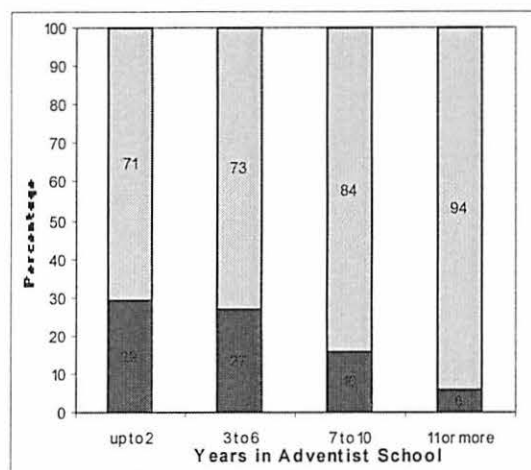
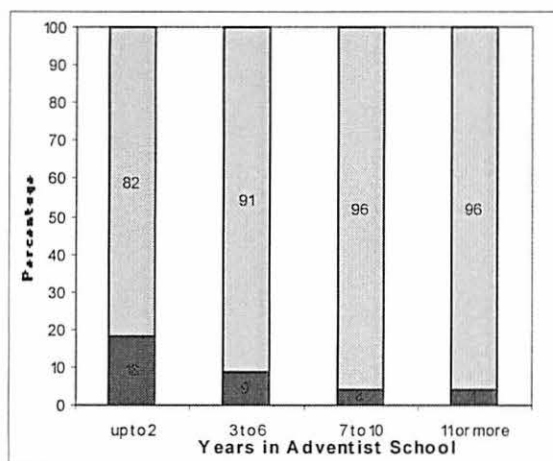


Although the students say they believe in the literalness of the Genesis story and that God created the plants and animals, it is not clear to them, how He did it and how much time He took to do it. We notice a progressive difference in the answers of the students according to the number of years they have studied within the Adventist educational system. Nevertheless, there is a percentage of students who have completed all their education in the Adventist school system and still do not know when animals and plants appeared on Earth, or affirm that they have evolved throughout millions of years. Also the number of students who prefer the option “I don’t know” is high.

Variation in the answers is observed if the word “evolution” appears (see the following two questions). This shows that the students relate to the word evolution in a negative way, but when asking the same question without using this term, the results are different.

Question: *Living beings have been appearing throughout million of years by means of an evolutionary process.*

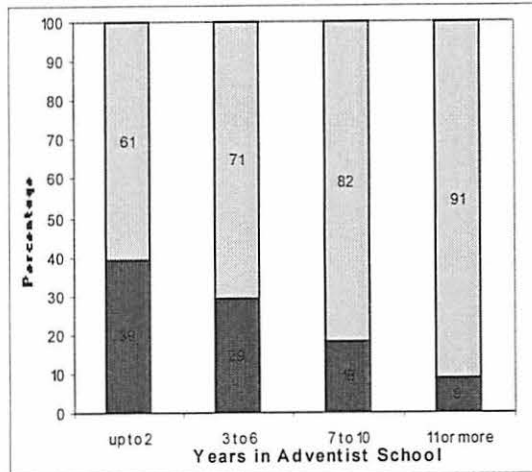
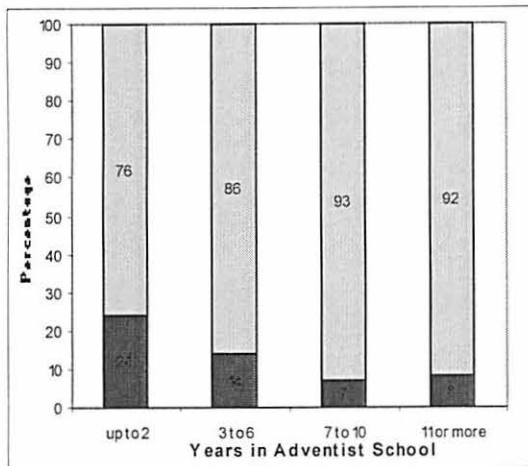
	ARGENTINA				MEXICO			
	2 years	3-6	7-10	11 or more	2 years	3-6	7-10	11 or more
T	18	9	4	4	29	27	16	6
F	82	91	96	96	71	73	84	94



Question: *Plants and animals have been appearing throughout long periods of time by evolution.*

		ARGENTINA			
		2 years	3-6	7-10	11 or more
T		24	14	7	8
F		76	86	93	92

		MEXICO			
		2 years	3-6	7-10	11 or more
T		39	29	18	9
F		61	71	82	91



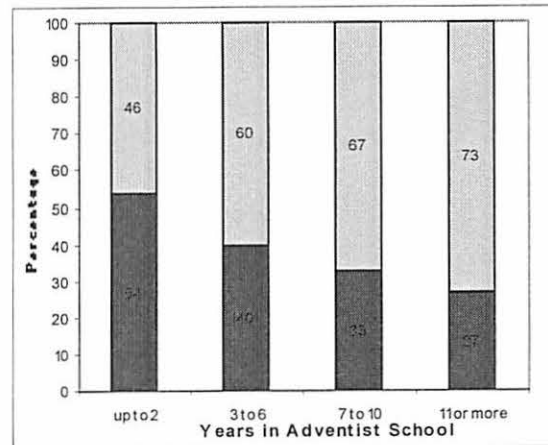
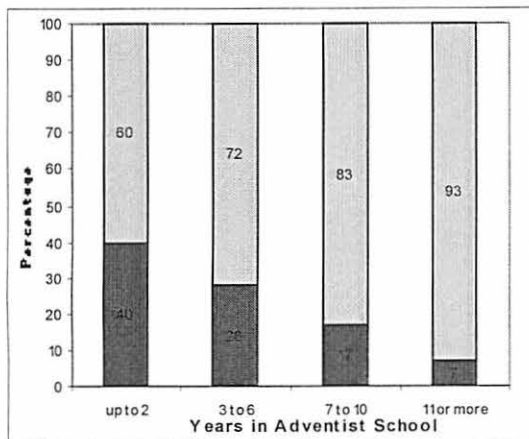
5. The dinosaur issue

Question: *Dinosaurs lived until 65 million years ago.*

		ARGENTINA			
		2 years	3-6	7-10	11 or more
T		40	28	17	7
F		60	72	83	93

		MEXICO			
		2 years	3-6	7-10	11 or more
T		54	40	33	27
F		46	60	67	73

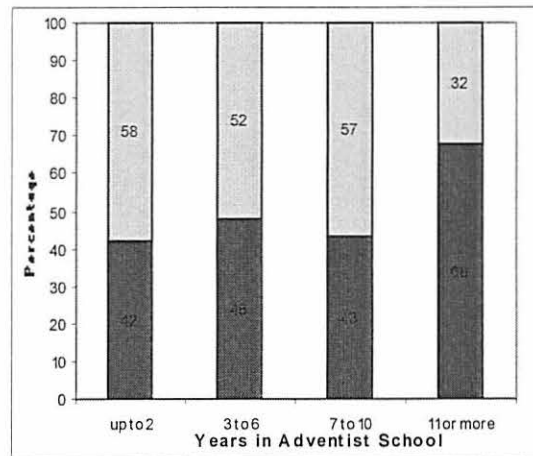
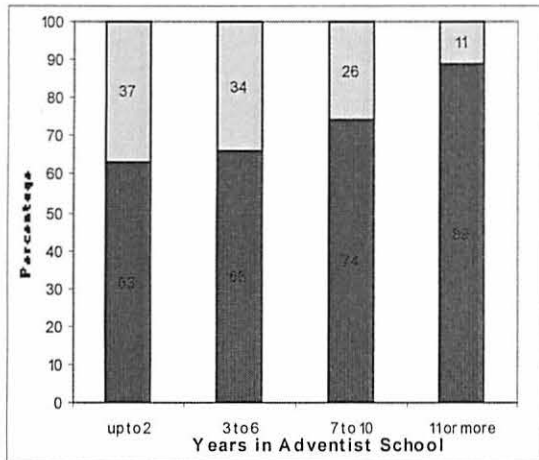
*150 students indicated that they had preferred the option "I don't know".



Question: *Dinosaurs were extinguished during the Flood.*

	ARGENTINA				MEXICO			
	2 years	3-6	7-10	11 or more	2 years	3-6	7-10	11 or more
T	63	66	74	89	42	48	43	68
F	37	34	26	11	58	52	57	32

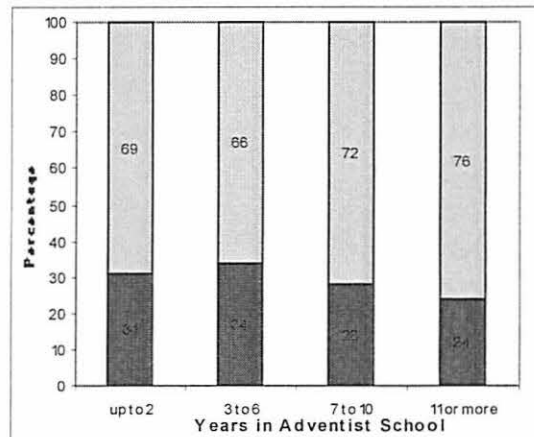
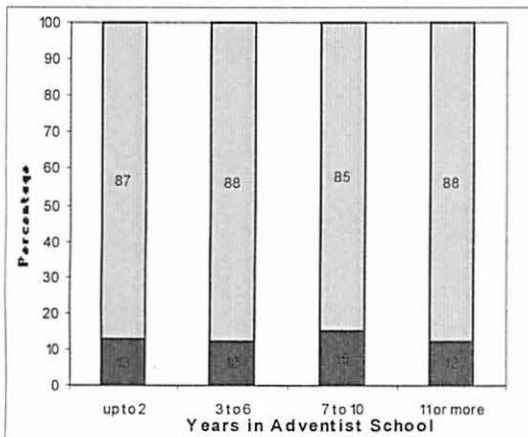
*104 students indicated that they had preferred the option "I don't know".



Question: *The first humans lived at the time of dinosaurs.*

	ARGENTINA				MEXICO			
	2 years	3-6	7-10	11 or more	2 years	3-6	7-10	11 or more
T	13	12	15	12	31	34	28	24
F	87	88	85	88	69	66	72	76

*70 students indicated that they had preferred the option "I don't know".



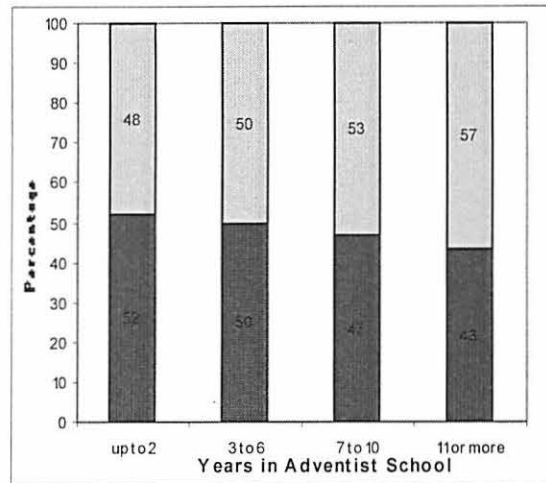
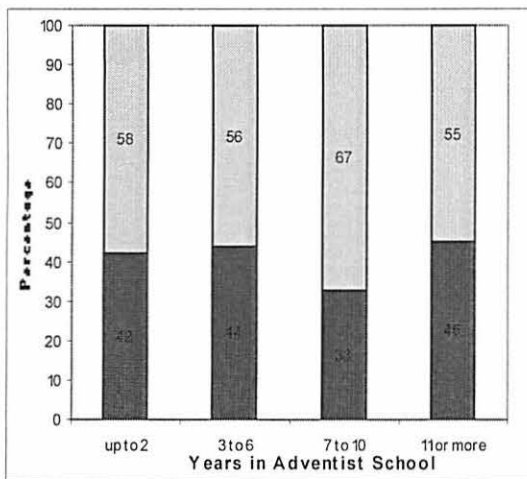
In this topic, the responses to the first question show a significant influence of the Adventist educational institutions. In the last question the influence of the Adventist institutions is not significant. The students' answers are similar and could suggest that they understand that dinosaurs did not coexist with man.

These three questions received the most number of "I don't know" responses (150 - 104 - 79), which indicates that it is a subject in which there is more work to be done.

6. Variation in species or speciation

Question: *Today we see more animal species and plants than in the beginning of life on Earth.*

	ARGENTINA				MEXICO			
	2 years	3-6	7-10	11 or more	2 years	3-6	7-10	11 or more
T	42	44	33	45	52	50	47	43
F	58	56	67	55	48	50	53	57



The responses suggest that this concept is not clearly grasped by the students. Also, the length of time the students have spent in the Adventist educational system does not affect the responses in a meaningful way. It might suggest a certain tendency to fixity of species.

Implications

The results of this study indicate that although the influence of Adventist education is seen in the majority of the answers, this influence has not been highly significant, especially in Mexico. From the findings some topics have been identified as priorities to work on in classroom instruction: the time and forms in which the animals and plants were created, the dinosaurs, mutations, microevolution and speciation.

In spite of some students having spent eleven or more years within the Adventist educational system, we can see that in several answers a significant percentage of them do not agree with the worldview that presumably had been taught. The conceptual change has not occurred.

After observing the results of this diagnosis we can ask: Among all the problems that affect Adventist education at this moment, is this sufficiently important to worry about and lead us to take action?

We have not found any previous studies dealing with this subject in Adventist schools in Latin America. Nevertheless, we consider this study to have a growing relevance at this moment, because Adventist students are increasingly exposed to the media, including television, the internet, and also books and popular scientific magazines, which are heavily laden with evolutionism.

The information provided by the media is biased, and the ideas conveyed settle as preconceptions, in this case erroneous, creating a duality but regrettably without causing major cognitive dissonance. Simply “it is filed separately” in the mind: this is religion, this is science. The cognitive dissonance will only appear if it is induced from the outside by teachers or others.

To face the work of the classroom another approach is required, which leads to the desired conceptual change, and this integration must be intentional, according to Rasi, a “deliberate and systematic process”, in order that at the time of leaving school, the students have internalized biblical values.

Recommendations

For the classroom process of teaching-learning:

The following suggestions are presented to obtain the conceptual change.

1. Give students the opportunity to identify their own ideas. Dialogue, discussion and verbalization by the students should play a fundamental role in the change of conceptions. Socio-cultural constructivism, based strongly on the ideas of Russian psychologist Lev Vygotsky, proposes that all learning occurs by means of the interaction between people who become committed in a shared speech.

Language has a fundamental role as mediator in knowledge construction. Cultivating the habit of the well-supported discussion, using dialogue to detect logical jumps in the arguments, will facilitate the construction of consistent arguments. In this sense, we must promote dissent between the students, but also provide the tools to build consensus. Team work, oral presentations, peer reviews, panel discussions between students are all ways of generating debate and consensus in the classroom (Gellon, 2005).

2. Facilitate the change from one concept to another. This change will be catalyzed in the first place by the personal experience of the student. Each student takes with himself his or her own explanatory systems that give sense to the world that surrounds him, which implies that he arrives at the classroom equipped with ideas which agree or disagree with what the teacher wants to teach.

This notion--that supplants the old idea of the student as *tabula rasa*--acquired force since the '80s when a new field of research began to be developed on methods for the acquisition of concepts in the sciences. Traditional instruction, based on oral as well as written presentations of scientific concepts, is unable to eliminate students' preconceptions. Another approach is required. According to Gellon (2005), the way to accomplish this would be to face students with destabilizing ideas, such as conflicting data and divergent ideas, which will provoke contradiction with their previous ideas. Then, students would be asked to explain themselves, and thus would become better aware of their preconceptions and how these are in conflict with the new idea. The teacher will select with care the activities in

which the students find these phenomena and will guide discussions to generate disagreement by the violations of student expectations to favor the rearrangement of the conceptions.

An illustration from the Adventist schools in Mexico. After taking the survey, I presented a talk on dinosaurs. The students were motivated; most of them had identified the following two statements as true: “Dinosaurs lived 65 million years ago” and “Plants and animals have existed on planet Earth for millions of years”, which coincides with their Biology textbook¹. The students were then asked to develop a timeline using the biblical stories they knew (Jesus, Abraham, Noah, Adam). This resulted in a destabilizing idea because they came up with only a few thousand years, and thus they became aware of the discrepancy. At this point the students were open to discuss and rearrange the years to fit the Biblical worldview.

3. Promote the analysis of information. Using strategies such as debates after film viewings, bulletin boards with postings of magazine and Internet clippings, lead to discussions, thus teaching our students to distinguish between the observation of data and their interpretation (Brand, 2006; Graham-Kennedy, 2007). It will be useful to consider historical cases of discarded paradigms, to evaluate that current scientific information is being understood under the interpretation of the evolutionist paradigm, and “their general acceptance does not guarantee their validity” (Roth, 1998, p. 44). The methodological naturalism that predominates in scientific studies must also be discussed, because it rejects a priori the existence of God, His revelation and His intervention in the natural world.

4. Analyze the information on textbooks, refining ideas and definitions in which evolutionary concepts are implicit or explicit.² Here are some examples. “Prokaryotic cells

¹ “Los anfibios pudieron haber surgido de una especie de peces que vivió hace 350 millones de años los cuales aunque tenían branquias para respirar bajo el agua, también tenían pulmones simples para respirar aire de la atmósfera terrestre. A lo largo de muchos millones de años y de manera gradual, sus descendientes emergieron a ambientes terrestres, por lo cual desarrollaron pulmones más complejos. De los anfibios surgieron los reptiles, que a su vez dieron lugar a las aves y a los ancestros de los mamíferos en los cuales el mecanismo de intercambio gaseoso es a través de los pulmones”. Cedillo, Aranzazu y otros. (2007). Ciencias 1. Biología. México: Editorial Santillana, p. 124

² “Durante muchos siglos, las maravillosas adaptaciones de los seres vivos, se consideraron una evidencia de la perfección del diseño divino. Pero Darwin pudo explicar el surgimiento de las

are older than eukaryotic”, “Gymnosperms are species older than...”. “Reptiles became adapted to separate themselves from the aquatic environment.” Did they adapt themselves or did God create them to adapt to that environment? When speaking of geologic periods, we take the names but we disagree with the chronology of millions of years. Like this, there are many other examples in which sometimes the evolutionist worldview is subtly introduced. A classroom strategy that can be used is the game “Finding the error,” with which we can teach adolescent students to look for conceptual error in their textbooks. In this way they will learn to read critically.

5. Propose demonstrating understanding. The answers of this survey showed that although the students affirmed to believe in the historicity of Genesis, in other answers they revealed that they did not know how and when the plants and animals were created. This duality leads us to the difficult area of comprehension. Perkins (1994) proposes the accomplishment of a variety of tasks that not only demonstrate understanding of a subject, but at the same time, they increase it. He named these actions “understanding performances.”

An example of this would be using learning confirmation exercises like the following. The students would be asked to take the controversial paragraph from their biology textbook and rewrite it following the creationist interpretation, sustaining their modification with pertinent bibliography. This kind of task leads us to a continuous evaluation where there is room for feedback from the teacher, from the peer group, as well as self-evaluation by the students.

6. Utilize the treatment of the subject of origins as a thread running across all courses (cross-cutting issues). A good example of this is the proposal developed by Cremades (2004), through intelligent design. I adapted this strategy, along with my science colleagues at the River Plate Adventist Institute, Argentina (7th, 8th and 9th grades). The results were manifest in the conceptual maps and diagrams that students elaborated at the integration period during the last two weeks of the school year.

adaptaciones y la evolución a través de un solo mecanismo: la selección natural”. Cedillo, Aranzazu y otros. (2007). Ciencias 1. Biología. México: Editorial Santillana, p. 43

This applies not only to Biology, Physics, History or classes where the issue of origins is more evident. If we want to obtain the integration of this conceptual change, it would have to be present as a cross-cutting issue in all the courses, as part of faith integration in the teaching-learning process of our Biblical worldview (Dos Santos Silva, 2002). We can see an example of such application in the English classroom of a teacher in the Florida Adventist Institute (Argentina), who, motivated during the Creationist Seminar decided to prepare her English lesson plans around the subject of origins.³

This integration will also be manifest in co-curricular activities like Science Club, Science Fair projects, visits to museums where the teacher surely will have to clarify our interpretation, and campouts in areas where fossils can be observed or collected.

For the general educational community:

In order to facilitate this conceptual change, it will be necessary to involve the educational community as a whole, that is to say, not only teachers and students, but also the larger community which includes administrators of the educational institutions, parents and the church.

Suggestions:

1. Teacher preparation programs will require at least one course in the Science of Origins. Future teachers will thus acquire scientific background to strengthen an informed decision in favor of creationism.⁴
2. Teacher continuing education programs, such as seminars and conferences, will present not only a creationist scientific foundation, but also require work on teaching strategies and self-evaluation, thus increasing the volume of strategies for the presentation of this subject in the different educational levels. This teacher preparation becomes essential in countries like

³ María Isabel Mateo. 2008. Instituto Adventista Florida, Buenos Aires, Argentina.

⁴ For instance, the Mexican ULV curriculum--in use for three years--only requires one class except in the Theology program. The School of Education program Plan Chiapas, when it was separated from Montemorelos University programs, eliminated this class from education tracks.

Argentina, for instance, where science teachers receive their education in secular institutions, because these programs are not offered in the Adventist university.

3. Natural Science Adventists textbooks: We do not support a curriculum based exclusively on a textbook, something which unfortunately occurs in the everyday reality of many educational institutions, where the content selection is based only on the points covered in the text. Nevertheless, we think that the Natural Sciences textbooks with a Creationist worldview would facilitate and provide guidelines for the teaching of these subjects.⁵

4. Youth Ministries: Our church can also strengthen the formation of our young people's understanding of the issue of origins through Youth Ministries. For example, this issue can be regularly present—giving it emphasis—in the Pathfinder and Master Guide Honors, in the Youth Society programs, in youth camps, and in ministries to our students in secular campuses.

5. Adventist publishing houses: It is important to prepare books (non-textbook) targeted to a young audience that treat the issue of origins⁶. This issue should also be included in youth magazines.⁷ Also it is necessary to review these publications carefully, in order to detect any errors where the evolutionist concept interferes⁸.

As we finish these two series of recommendations, we would like to mention that after implementing them for a certain period of time, it would be advisable to carry out a

⁵ The South American Division has made progress in this area in Portuguese (Science books for all levels) and the Spanish Natural Sciences texts are in the planning stage in Argentina (for 7th, 8th, and 9th grades). It would be important to consider this possibility in Mexico as well. It may begin with reduced modules, although they do not include the whole program, but only the most controversial issues.

⁶ The publication of Dr. Kennedy's book on dinosaurs has been a good starting point in South America. Hopefully it can arrive in Mexico.

⁷In a review of the youth magazine *Expresión Joven* (*Gema, Mexico*), only one article was found within the last two years, although the magazine has a "Scientific World" section, entitled "Puedo creer" (*Mundo Joven*, Julio 2006), where Dr. Elaine Kennedy gave her personal testimony and expressed a few of her ideas on creationism.

⁸ For instance, "En estado natural la evolución del ADN normalmente lleva varios millones de años, en un ambiente libre de factores externos con especies que viven en conjunto y equilibrio". Ana María Cadena, (2007). La revolución verde se torna oscura, *Mundo Joven*, N°13, N° 4, p.13.

deferred evaluation of the items presented in this questionnaire, in order to determine whether or not the influence of Adventist education on the students in Mexico and Argentina has increased their understanding of origins from the biblical worldview perspective.

Likewise, Adventist educational administration and science teachers in other areas of the world may consider the advantages of conducting similar surveys to assess the impact of Adventist education on students in order to take initiatives designed to address any issues that require attention in the area of science education.

Conclusion

The results of this research confirmed the need to implement the topic of origins in our secondary schools in an intentional and systematic way in order to improve its comprehension and internalization in the context of the biblical worldview. This paper only offers some strategies as recommendations and as an opening to the pedagogical challenge which we would like to foster.

The adequate integration of this tenet of our faith in the teaching-learning process in our secondary Adventist schools is an open door to teacher creativity and a challenging road on which we have a long way to travel.

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