

Methodological and didactic conception in morphophysiology improves cognitive ability.

Abreu Ugarte JE^{1*}

Saldaña Bernabeu A¹

Benavides Socarras OE¹

Cruz García MA²

¹Medical Sciences University of the Revolutionary Army Force, Department of Morphophysiology. Cuba

²Medical Sciences University of the Havana, Department of Embriology. Cuba

*Correspondence author: jabreu@infomed.sld.cu

ABSTRACT

Introduction: A current purpose of the medical education is to achieve the prominence of the biomedical subjects in the preparation of the doctors. The suitable motivation is the most adapted way to reach it. In Cuba, the medical teaching has assumed changes with marked incidence in the biomedical subjects. The morphophysiology emerged to integrate with didactic ends the morphological and physiological contents. What created disjunctives about the methods and means for the teaching morphological contents, in front of the tendency to substitute the traditional forms by computer images. It was a problem to resolve by means of the educational search work and methodological scientist.

Objective: This work has the aim to value the impact of pedagogical didactic – actions implemented in medicine students of first year to develop cognitive ability in profit of the process of education learning.

Methods: The universe was the learning results of the medicine students and the courses among 2008 and 2013 constituted the sample. By random way were taken in each course experimental and control groups. In the first was stimulated the motivation with the method basic on problem, the employment of the optical microscope, histological slides

and anatomical pieces. The averages of the experimental groups and controls was compared, in the same manner was compared with total and the accumulated average.

Results: The averages of the experimental groups resulted upper to the of the groups control and to the academic average accumulated. Of this way verified the hypothesis posed that the actions implemented in the methodological didactic conception based in the method basic on problem resulted favourable for the development of the cognitive ability of the students.

Conclusions: The method basic on problem link with means of traditional education in the morphological sciences, combining them properly with the new means of digitalized images stimulates the motivation, favours the development of cognitive ability and increases the academic results.

Key words: morphophysiology, cognitive ability, didactic.

Abraham Flexner⁽¹⁾ in a report on medical teaching resulted of an extensive study in north american universities in the past century, remarked in the importance of the basic sciences biomedical fort the studies of medicine, not only in the first years but during completely in the career. This question keeps like a crucial topic in the current debates between diverse pedagogical tendencies.

In the majority of the countries, the progresses in the medical education have a permanent interest by the importance of the professional that has to form, with the commission to preserve the health, which is a right of all human being.⁽²⁾ The common purpose is to attain the integral training of doctors that promote the individual health and comunitaria.

In this sense traced like contour of work the employment and the development of the active methods of education headed to promote the capacity of the students to learn and communicate. What this in correspondence with the contemporary conception of the upper medical education in our country, that drives to the appropriation of the contents and the forms to think, feel and act, built in the experience partner-historical with the end to comprise the reality and transform it.

In Cuba, the medical university systematically works to perfect the medical education, create better conditions in the educational stages and look for the models of education more adapted for the training of the professionals of the health, in function of the optimum exert given his significance for the welfare of the society.

Some university professors^(3,4) conceive proposals curricular in the medical sciences that look for to renew the didactic conceptions of the process teaching and learning in the biomedical subjects. The use of the computers and its images was exalted like replacement of the traditional means of teaching, what is like dialectic contradiction with moderate positions regarding the means of education that is more convenient to employ. Nevertheless, the new pedagogical alternatives based essentially in the employment of the means of computation and its images go entering rapidly in the medical teaching.⁵ However, no always they were evaluated neither based by evidences that justify its benefits.

At the beginning of this century in the medical universities of our country was implemented a plan of study for the career of medicine that introduced the morphophysiology (MF) like an academic discipline that attained to integrate with didactic ends the contents of the signatures morphological and physiological.

In spite of its successful and constant improvement, at all times persisted skeptical opinions on the results in the educational performance of the students, attributing it to the excessive use of the computer's images, suggesting the question: what half of education would be the most convenient in order to attain better educational result?

This disjunctive was identified like a pedagogical problem for the methodological scientific work, like road to look for theoretical foundations that back strategies and actions for his solution, with the purpose to perfect the educational process, his results and increase the pedagogical mastery of the university teacher team.

The expressed before drives to the following hypothesis: The active forms of education with the use of the means of traditional education of the Morphophysiology combined with the computer's images might to help the motivation and they also can contribute in this way to the development in the students their cognitive ability

The pedagogical investigation like road for the improvement of the educational process-educational motivated the realization of this study with the aim to show that the employment of the means of traditional education in the subject morphophysiology are appropriated to attain the motivation of the students, to achieve the development of the cognitive ability and improve the academic result.

MATERIALS AND METHODS

Universe: students of medicine of Upper Medical Education. Sample: students of the University Hospital “Dr. Carlos J. Finlay” from five academic courses, including the initiated in 2008 and the concluded in 2013.

Design: it was done a pedagogical investigation in three stages, with a transversal and comparative study in the subjects (I – VI) that integrate the discipline MF. It selected of random way one experimental group by each course instead the others groups were considering like the controls.

Independent variable: intentional pedagogical actions. Dependent variable: educational results of the subject MF I of the MF discipline and the academic index (AI) when they ending the fifth year of the career.

In the theoretical classes of MF I was employed the method problémico with models of clinical basic – interaction in the experimental groups. In addition, it was used a pedagogical conception conceived according the sequential character of the mental actions, with the “invariants” like didactic strategy in MF I.

In the practical classes used like means of teaching: the histological slide colored with the technician of hematoxilin – eosin, the optical microscope of brilliant field for the observation of the cellular components, the varieties of basic tissue and the structures in the embryonic development, as well as anatomical pieces.

For the independent study was indicated the graphic representation of the observed by the students, with support of microphotographs in paper and computer format. The seminars were based in the solution of problems, with the method of conjoint preparation. While in the groups control only employed computer images.

The instructors who gave the practical classes were prepared about his intervention. The distribution of the groups was by the random way. The double blind method was used to evaluate the ending test.

First step: study in the short term (a semester) to evaluate the impact of the pedagogical intervention on the educational performance in the subject MF I.

Second step: study to average term (3 semesters) of the educational results in the others subjects (MF II – VI) of the academic discipline MF, in these used like half of education in the experimental groups the models and anatomical pieces.

Third: long-lasting study through a long-term basis (5 years) to evaluate the impact of the pedagogical actions on the IA when concluding fifth year, when the medicine student have received all the clinical and surgical subjects of the career.

The data was registered and processed in tables by Excel Microsoft Office 2016. It used the arithmetical average, the percentage and the variance. F test was used to determine differences between experimental and controls groups. Chi – squared test for homogeneity with significance of 0,05 was used too.

It was employed the analytical – synthetic methods. A bibliographic review was done. The bioethical principles and the informed consent were applied.

Results

The total averages of all subjects that integrate the MF has tendency to increase in the five course. The average accumulated (μ) in the academic discipline is 3,96. The averages of the subjects MF (I – VI) of the five included courses in the investigation expose in the table 1. The comparison by pair off between the experimental groups and controls showed that the average of the experimental group is upper in 24 occasions (83 %). The total averages in the five courses also were upper in the experimental groups. The F test showed significance with a value of 0,74930973.

Table 1. Averages of the academic results in experimental groups and controls.

Subject	Course									
	2008-2009		2009-2010		2010-2011		2011-2012		2012-2013	
	EG	CG	EG	CG	EG	CG	EG	CG	EG	CG
MF I	4,35	4,28	4,48	4,47	4,26	3,90	4,00	3,69	4,43	4,02
MF II	4,03	3,44	4,52	4,13	4,81	4,04	4,58	3,55	4,37	4,25
MF III	4,06	3,44	4,06	4,13	3,63	4,04	3,73	3,55	4,23	4,22
MF IV	3,84	3,53	3,74	3,77	3,55	4,40	4,38	3,76	4,30	4,26
MF V	4,00	3,72	4,03	3,47	4,29	3,71	4,15	3,75	3,83	3,01
MF VI	4,19	3,63	3,90	3,73	3,70	3,93	4,35	4,21	3,20	3,93
TOTAL	3,41	3,10	4,12	3,95	4,04	4,00	4,20	3,76	4,06	3,95

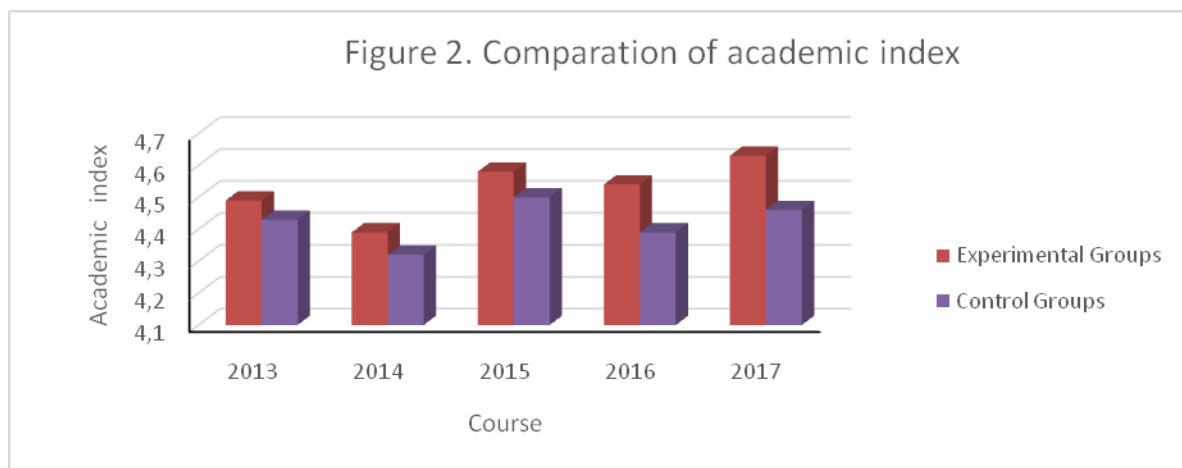
Legenda. MF: Morphophysiology, GE: Experimental Group, GC: Control Group.

In the table 2 observe the results of the comparison of the experimental groups and the controls with the average accumulated, with predominance of the experimental groups on the average accumulated, the Chi- square test showed significant difference ($p = 0,001770205$).

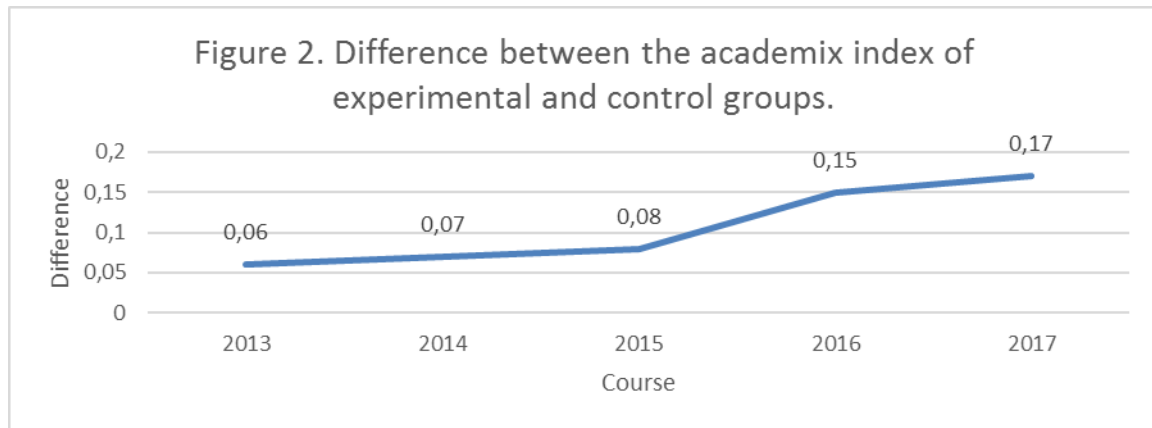
Table 2. Comparison of the average of the groups with the accumulated average.

μ	Experimental Group	Control Group	Whole
> 3,96	22	11	33
< 3,96	8	19	27
Whole	30	30	60

The averages in the subjects MF (I – VI) put of self-evident the positive impact of the pedagogical actions on the development of cognitive ability, average term and in the educational results. The figure 2 shows that when concluding the fifth year the AI was upper in the experimental groups.



In the figure 2 it can appreciate the progressive and significant increase of the interval of difference among the IA when the students concluding fifth year of the career. This confirms the profits of the didactic actions implemented on the educational results for a long-term.



DISCUSSION

The results show that the pedagogical conception with the means of traditional instruction helps the academic performance, what as curtained by the highest averages in the experimental groups in the three stages of the study.

Without refuter the employment of the computer images, this study checked the benefits of the employment of the optical microscope, histological slides, microphotographs in paper or digital and the anatomical pieces in the teaching of the morphophysiology topics, for favoring the learning and contribute to the best understanding of last subjects, like physiology, genetics and pathology.

The computation has established a revolution in the education, however the reasonable use of the computer images combined with traditional forms of education in the morphological sciences attain better results in the educational work from the instructive.^(6,7)

In order to develop the neurophysiology processes, like the attention and the memory, it must use methods and means of instruction adapted at the subject. As well as orient only essentials topics might to facilitate and permit the learning in the morphological subjects, since the molecular level of organization led to comprise better the histology and anatomy. Because those are the morphological base which subtend the normal physiological and pathological processes.

The present study directed the educational and pedagogical work to led the students of his responsibility like true leading of his learning, like active of his rational activity. The didactic actions headed to motivate the mental activity creator, with the premise: learns is

a process of research and of contradictions, with autonomy and responsibility, of commitments and put to attention in it.

The career of medical sciences is considered like the university branch in which the students manifest main levels of stress.⁽⁸⁾ In this context have identified diverse situations for stress: it overloads of tasks and duties, excess of educational evaluations, time limited, insufficient orientation for the independent study and the suitable places for his realization.

The stress environment is main in the first years of the career in which taken the basic biomedical subjects, what can attack against the motivation of the students and affect his academic performance.⁽⁹⁾ To attenuate his effects recommends the work of vocational training, insider on the emotions with actions that take into account the individual vulnerability of the students, as well as the personality and the character of the own educational, can contribute to the learning and to the development of the cognitive ability. The students exercise to pipe his cognitive activity, so that they internalize it like the essential process in his results, conferred to the act to learn the paramount worth of his intellectual development, based by technological means employees and pedagogical to learn.

The didactic has to the education as if fundamental category, his actioner of group with the learning complement, does not exist one without another. The first is systematic promotion of the second. By what does necessary deepen in the essence of this dialectic relation, base with scientific evidence the actions that exerts the professor in the process of teaching and learning to increase the quality in the exert of the students.

The relation throw other subjects is one important form to attain the motivation through the links with situations of health that allow to tackle the contents of the biomedical basic sciences from the first years of the career of medicine.

The results of the present study offer details for the methodological educational work, to the discerner main appearances of the process teaching learning, like the dialectic way to employ the material base of study in the morphological sciences without poignant contradiction between the new and the old-style. Besides, it offers a model of useful pedagogical investigation like way of solution of educational problems.

It is feasible the implementation of the results through the methodological indications of the subjects of the Biological Base of the Medicine of the current strategy of study of the career.⁽¹⁰⁾

It recommends realizes studies that deepen in the essence of the upper nervous activity, the memory, the development of the intelligence and of the intellectual capacities in his physiological relation with the learning.

CONCLUSION

A new pedagogical conception has to base in the dialectic's laws of the development, the employment of the new advances of the digital epoch properly combined with the means of own education of the subjects morphological attained better results for the development of skills cognitive.

REFERENCES

1. Vicedo Tomey AG. Abraham Flexner y la Educación Médica, a cien años de distancia. EDUMECENTRO [Internet]. 2013 [citado 2018 Abr 27]; 3(3):[aprox. 7 p.]. Disponible en: <http://www.revedumecentro.sld.cu/index.php/edumc/article/view/145>
2. Mejia CR, Verastegui-Diaz A, Aranzábal-Alegría G, Quiñones-Laveriano DM, Lopez CE, Toro-Huamanchumo CJ, Astocondor-Altamirano JV, Arce-Villalobos LR, Díaz SY, et al. Nivel de satisfacción en ciencias básicas en estudiantes de medicina de siete Universidades del Perú: Trabajo multicéntrico. Educación Médica Superior [Internet]. 2017 [citado 2018 May 10];31(3):[aprox. 1 p.]. Disponible en: <http://www.ems.sld.cu/index.php/ems/article/view/1072>
3. Gutiérrez Maydata A, Wong Orfila T, Pérez de Armas A, Villar Valdés M. Propuesta para dar continuidad al perfeccionamiento de la Morfofisiología en la carrera de Medicina. EDUMECENTRO [Internet]. 2013 [citado 2018 Abr 27]; 4(3):[aprox. 13 p.]. Disponible en: <http://www.revedumecentro.sld.cu/index.php/edumc/article/view/196>
4. Toledo Méndez MA, Cabrera Ruiz II. Corrientes psicológicas determinantes de la concepción del aprendizaje en la enseñanza médica superior. Educación Médica Superior [Internet]. 2018 [citado 2018 Abr 14];31(4):[aprox. 0 p.]. Disponible en: <http://www.ems.sld.cu/index.php/ems/article/view/1094>
5. Marrero Pérez MD, Santana Machado AT, Águila Rivalta Y, Pérez de León A. Las imágenes digitales como medios de enseñanza en la docencia de las ciencias médicas. EDUMECENTRO 2016; 8(1):125-142 Disponible en:

- http://www.revedumecentro.sld.cu/index.php/edumc/article/view/515/pdf_128
6. Vázquez VR., González M., Castellanos M. Torres C., Marrero I., Benet M. “Metodología de evaluación del proceso docente educativo en la disciplina de Morfofisiología” Rev Medisur [Internet]. 2014 [citado 2018 Abr 27];12(1): 200-18. Disponible en: <http://medisur.sld.cu/index.php/medisur/article/view/2640/1443>
 7. Rosell Puig W, Dovale Borjas C, González Fano B. La enseñanza de las Ciencias Morfológicas mediante la integración interdisciplinaria. Educ Med Super [Internet]. 2004 Mar [citado 2018 Mayo 23];18(1): Disponible en: http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-21412004000100003&lng=es.
 8. García Gascón Á, Del Toro Añel AY, Cisneros Prego E, Querts Méndez O, Cascaret Soto X. Algunas variables psicosociales asociadas al bajo rendimiento académico en estudiantes de primer año de medicina. MEDISAN [revista en Internet]. 2017 [citado 2018 Abr 27]; 21(4):[aprox. 0 p.]. Disponible en: <http://medisan.sld.cu/index.php/san/article/view/1085>
 9. Cabrera Llano JL, Villar Váldez M, Alfonso Arbolaez LE. La Morfofisiología y el rendimiento académico del estudiante: un problema vigente. EDUMECENTRO [Internet]. 2016 [citado 2018 Abr 27]; 8(1):[aprox. 6 p.]. Disponible en: <http://www.revedumecentro.sld.cu/index.php/edumc/article/view/692>
 10. Gutiérrez-Maydata A. Lo novedoso en el plan de estudio D en la carrera de Medicina. Medicentro Electrónica [revista en Internet]. 2017 [citado 2018 Abr 27]; 21(3):[aprox. 1 p.]. Disponible en: <http://www.medicentro.sld.cu/index.php/medicentro/article/view/2448>