



DNA Markers for *Capsicum* Species Found in the Philippines

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Molecular markers were established for five *Capsicum* species found in the Philippines. The DNA from the leaves of *Capsicum annuum* and *Capsicum frutescens* were successfully isolated using the modified CTAB Method. This is a suitable method for plant DNA isolation since it can reduce plant cell contaminants such as polysaccharides and secondary metabolites which can interfere in extracting pure DNA. The presence of DNA from the *Capsicum* isolates was verified by agarose gel electrophoresis. The concentration and purity of the DNA were determined by evaluating the relative absorbance at 260/280 by UV-Vis spectroscopy. The isolated DNA samples were digested by restriction enzymes EcoR1, HindIII and EcoR1/HindIII mixture, and the resulting fragments were analyzed by agarose gel electrophoresis and pulse-field gel electrophoresis (PFGE). The bands were stained with ethidium bromide, viewed under ultraviolet light, and recorded with a digital camera. With the DigiGenius SynGene Tools Software, the total DNA and Restriction Fragment Length Polymorphism (RFLP's) were analyzed. The molecular weights of the DNA from *Capsicum annuum*, *Capsicum frutescens*, *Capsicum frutescens* L, *Capsicum frutescens* var. and *Capsicum annuum* var. *longum* were 527.95, 507.41, 323.65, 363.02 and 277.21 kilobase pairs (kbp), respectively. The variation in fragmentation patterns of *Capsicum annuum* and *Capsicum frutescens* was principally due to the difference in size and base composition of their DNA. The RFLP's generated can serve as a fingerprint to distinguish *Capsicum* species. More precisely unknown samples of DNA may be run

simultaneously with the known samples as standards and the RFLP's compared in order to assess a close or exact match. Molecular markers are important tools in taxonomic classification. Results from this research will also be valuable in the fields of biotechnology, genetic engineering and food technology.



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Random Amplified Polymorphic DNA (RAPD) Analysis of Selected Philippine *Vanda* Species and Related Orchids

The orchid genus *Vanda* belongs to the largest family of flowering plants -the Orchidaceae, many of them endemic to the Philippines. There are over 900 species of orchids in the country representing almost 10 % of the entire flora. Orchids grow in the wild as terrestrial plants or epiphytes, and are collected or cultivated by enthusiasts and growers. It is economically important as part of the cut flower industry. Although orchids have been studied since a very long time, the taxonomy of orchids is in a constant flux since it is currently based generally on morphological characters. Partly due to the strong heterozygosity displayed by them, large variations occur among species, creating confusion regarding taxonomical status based on morphological descriptions of some species. The situation gets complicated because the orchids can breed easily with other species within the same genus or with those of closely related genera giving rise to hybrids. Such hybrids often show habit and growth behavior similar to other species, thus adding to the confusion. This has led to different versions of classifications and relationships among the orchids.

Recent advances using molecular techniques like isozyme analysis, Restricted Fragment Length Polymorphism (RFLP) and Random Amplified Polymorphic DNA (RAPD) have contributed to understanding phylogenetic relationships among the orchid groups. Since these techniques rely on genomic information rather than the morphologic, they are seen to be more useful in studying relationships. With the available resources, this study focused on selected members of the Philippine *Vanda* and related species, as well as one "new" as yet unidentified vandaceous species collected from Cotabato, in order to study genetic relationships using the RAPD technique. The main objective was to obtain preliminary genomic data to be able to assess the relationships among the different species of the Philippine *Vanda* and its related species [namely -*V. lamellata*, *V. merillii*, *V. luzonica*, *V. ustii*, *V. roeblingiana*, *V. javierae*, *V. sanderiana* syn. *Euanthe* and related species like *Trichoglottis*, *Ascocentrum*, *Euanthe* and *Renanthera*].

The genomic DNA was extracted from leaf samples using the modified CTAB method and RAPD was performed using PCR Core System I kit (Invitrogen) in a thermocycler (MJ Research PTC100) using fourteen different Operon primers. The optimized reaction conditions were: 50 μ l reaction volume, containing 1x PCR buffer, 4 mM $MgCl_2$, 400 μ M of dNTPs, 1 μ M Operon Primer, 1 to 2 U of Taq Polymerase Enzyme and 25-50 ng of sample genomic DNA. The amplified DNA fragments were run on a 1% agarose gel (1X TAE buffer), stained with ethidium bromide and visualized under UV illumination. Out of the 14 operon primers used in this study only two (OPU 5 and OPU 12) generated amplified bands in the reactions. The gel pictures were documented and the RAPD bands were analyzed using the RAPDistance 1.04 software.

The genetic distances as seen by the dendrogram generated by RAPDistance 1.04 broadly agreed with the general classification. Closeness of *Ascocentrum* as well as that of *Vanda sanderiana* alba syn *Euanthe* to the vandaceae is evident. This observation supports the view that *V. sanderiana* is indeed closely related to the vandaceae and possibly does not merit a separate monotypic genus *Euanthe*. The result of this study confirms for the first time the position of the "new" tentatively identified *Vanda* species collected from Cotabato, since it groups with *Vanda merrillii*, *V. luzonica* and *Ascocentrum aurantiacum*. Thus, it also clears the initial doubtful identity as being a vandaceous species based on habit and morphology alone. However, the dendrogram shows. However, while strap-leaved *Trichoglottis agusanensis* groups with the *V. merrillii*, *V. sanderiana*, *V. luzonica* and the related *Ascocentrum aurantiacum*, it is to be noted that *T. brachiata* (with short oblong-elliptic leaves) groups separately. It shows closer relatedness to *V. lamellata* var. *boxalli*, *V. ustii* and *Renanthera monachica*, all strap leaved. Further study of populations with a wide range of operon primers resulting in many RAPD markers is needed to evaluate and expound further relationships among the members.

In conclusion, the genomic RAPD data can reveal relationships between different taxa and can serve as an additional method of determining and verifying phylogenetic relationships (and hence taxonomic positions) of species, especially of those whose relationships are in doubt.



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Vanda merrillii

TV Audience/Manonood/Odyens: Kritikal na Pagsusuri sa Pagsasalin sa Telebisyon

Layunin ng riserts na ito na imbestigahan ang asampsyon ng risetser na ang *programming* sa TV ay karakterays ng dalawang klase ng salin: ang una ay ang pagsalin ng mga banyagang programa sa pamamagitan ng *dubbing* at ang pangalawang uri ay ang imitasyon/apropriyasyon/lokalisasyon ng mga banyagang programa sa local na programa. Dahil sa ang mga pagbabagong ito sa *programming* at sa odyens ng telebisyon ay hindi simpleng usapin ng pagsasalin lamang kung kaya't kailangang imbestigahan ang transpormasyon ng *landscape* ng *programming* ng telebisyon at ang maaring subersyon na ginagawa ng TV *audience/manonood/odyens* dahil sa kakayahan niyang isalin at itransform ang mensahe.

Sa unang bahagi ng riserts na ito, inilarawan ang katangian ng pagbabago sa *programming* ng telebisyon, sa pamamagitan ng paglalarawan ng katangian ng mga programa ng telebisyon sa nakalipas na limang taon mula 1997 hanggang 2001.

Sa pangalawang bahagi, ispesipikong tinalakay at sinusuri ang mga *televisual representations* na *present* sa mga programang napili. Pumipili ang risetser ng mga isina-Filipinong banyagang programa sa kanilang popularidad. Pumili ng apat na programa sa telebisyon na isinalin sa pamamagitan ng *dubbing* (*Monica Brava*, *Alicia*, *Dragon Ball Z* at *Lupin III*) at sa apat na programang isinalin sa pamamagitan ng imitasyon/adaptasyon (*Batibot*, *Sa Tabing Ilog*, *Munting Paraiso* at *GameKnB*).

Sa pag-aanalisa ng mga isina-Filipino programa sa pamamagitan ng unang *mode* ng salin, ang *dubbing*, tatalakayin ang mga linggwistika, politiko-kolonyal at sosyo-politikal na faktors bilang mga *televisual representations* ng mga programa na nakaapekto sa kanilang popularidad.

Sa pagtatalakay naman ng mga katangian ng mga programang lokalays ay inilarawan ang enterteynment at *melodramatic* na *representations* na meron ang mga banyagang programa na ginagaya at inapropriyet para maiadap sa lokal na panlasa.

Mula sa mga pagtukoy, paglarawan at pag-aanalisa sa mga pagbabago sa TV *programming* ay sinuri ng risetser ang implikasyon ng transpormasyong ito sa TV *audience/manonood/odyens* bilang isang mahalagang salik ng mga pagbabago sa TV. Ginagamit bilang batayan ang mga teorya ng *Cultural Studies* nila Stuart Ha;; (1981) at Homi Bhabha (1994).

Sa pangatlong bahagi ng riserts ay ang presentasyon ng risetser ng mga implikasyon ng mga popular na isina-Filipinong programa sa TV *audience/manonood/odyens*. Tinalakay sa parting ito ang implikasyon ng popularidad ng ganitong programa sa pagkakaroon ng *counter-hegemonic* na kapangyarihan ng mga Filipino na isinalin ang kanilang napanood na texto at itransform ito para iayon sa kanilang kontekto.



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Structural Studies of Chemical Isolates and Synthesis Products by X-ray Diffraction: The Crystal Structures of $[Ru(dppe)Cp^*C_6I(CN)_4 \cdot \frac{1}{2}(C_6H_6)]$, $[Ru(dppe)Cp^*C_6I(CN)_4 \cdot \frac{1}{2}(C_2H_5OC_2H_5)]$, and $[Ru(dppe)Cp^*C_4(CN)_4]$.

The crystal structures of $[Ru(dppe)Cp^*C_6I(CN)_4 \cdot \frac{1}{2}(C_6H_6)]$, **I**; $[Ru(dppe)Cp^*C_6I(CN)_4 \cdot \frac{1}{2}(C_2H_5OC_2H_5)]$, **II**; and $[Ru(dppe)Cp^*C_4(CN)_4]$, **III**, were solved by single crystal x-ray diffraction at 150(2) K using a Bruker SMART CCD diffractometer.

I and **II** are isomorphous crystallizing in space group $P\bar{1}$ with 2 molecules per asymmetric unit. The cell parameters for **I**: $a = 15.706(2) \text{ \AA}$, $b = 16.891(2) \text{ \AA}$, $c = 17.669(2) \text{ \AA}$; $\alpha = 100.360(2)^\circ$, $\beta = 102.755(2)^\circ$, $\gamma = 98.698(2)^\circ$, $V = 4407.3(9) \text{ \AA}^3$, $Z = 4$; for **II**: $a = 15.786(3) \text{ \AA}$, $b = 16.885(3) \text{ \AA}$, $c = 17.620(3) \text{ \AA}$, $\alpha = 100.30(3)^\circ$, $\beta = 102.62(3)^\circ$, $\gamma = 99.80(3)^\circ$, $V = 4400.8(18) \text{ \AA}^3$, $Z = 4$. Residual benzene solvent molecules are found in **I** while residual diethylether solvent molecules are found in **II**. Crystal **III** crystallized in the space group $P2_1/n$ with cell parameters: $a = 13.362(3) \text{ \AA}$, $b = 17.193(3) \text{ \AA}$, $c = 16.114(3) \text{ \AA}$; $\beta = 98.96(3)^\circ$, $V = 3656.7(13) \text{ \AA}^3$, $Z = 4$. All non-hydrogen atoms were refined anisotropically. Hydrogen atoms were located at geometrically calculated positions. Final cycles of full-matrix least squares refinement converged at R and wR values of: **I**, 0.047, 0.066; **II**, 0.054, 0.069; **III** 0.059, 0.073, respectively. All structures exhibit distorted octahedral geometry about the Ru center. The P atoms of dppe are coordinated to Ru at a distance ranging from 2.27 \text{ \AA} to 2.30 \text{ \AA}. The distance of Ru to the C of the acetylenic chain is about 1.9 \text{ \AA}. The Cp* ring sits atop the Ru at a distance about 1.9 \text{ \AA} away as defined by the plane of Cp*. Bond lengths and angles of the dppe, Cp*, and the acetylenic carbon chain as well as those of the cyano groups are normal.

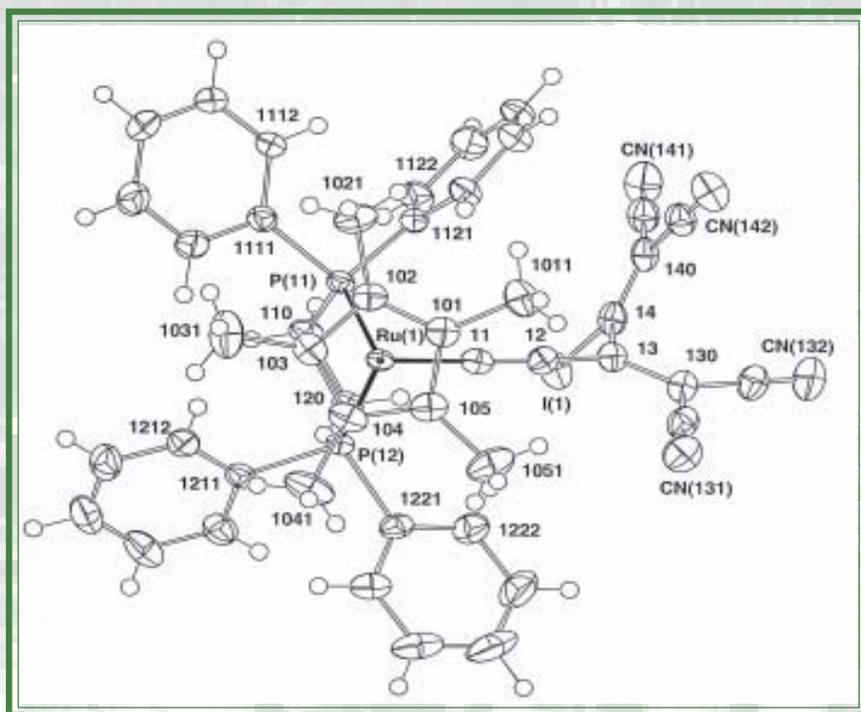


Figure 1. $[Ru(dppe)Cp^*C_6I(CN)_4 \cdot \frac{1}{2}(C_6H_6)]$, Molecule 1



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Development of a Robust Procedure for Network Synthesis in Water and Hydrogen Allocation Problems

Prior work has demonstrated the applicability of Zimmermann's symmetric fuzzy linear programming (SFLP) as a robust method for designing near-optimal reuse networks for industrial water conservation under conditions of data uncertainty. The procedure was shown to be suited for single-component retrofit problems formulated either as mass exchange or source/sink superstructures. Three extensions of the concept that we subsequently developed are described in this paper. The first one is the use of methodology for design problems involving multiple components or water quality parameters. The second variant shows the use of SFLP for property pinch problems, wherein water quality is described not just in terms of component concentrations but more generic properties such as pH or temperature as well. These first two variants represent a major step in enhancing the usefulness of the method in solving realistic industrial water reuse problems, where multiple conditions have to be met to ensure the suitability of a water for feeding to a water-using process. The third extension shows how SFLP can be used in solving hydrogen pinch problems encountered in integrated petroleum refineries. This new application is made possible by the fundamental similarity between water and hydrogen stream allocation problems involving multiple sources and sinks.

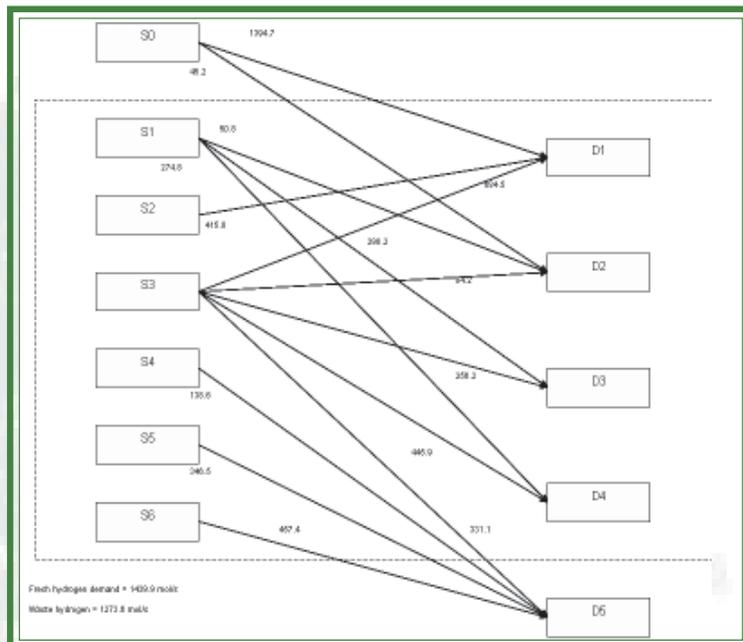


Figure 1. Robust Water Allocation Network Generated Using SFLP (Flowrates in mol/s)

Optimal utilization of hydrogen streams in refineries using process techniques is necessary as the rising cost of high-grade crude oil forces companies to use feedstocks of lower grade. Lower grades of crude oil can be used to make petroleum products of the desired quality level through a variety of thermochemical conversions such as hydrocracking and hydrothreating. Optimal allocation of hydrogen streams of required flowrates and concentrations can be done using different integration techniques, including mathematical programming. In practice accurate stream data is not always available. Synthesis of hydrogen allocation networks under such conditions of uncertainty can be done using symmetric fuzzy linear programming. This approach, which was originally applied to water allocation problems, is demonstrated using a hydrogen integration problem from literature.

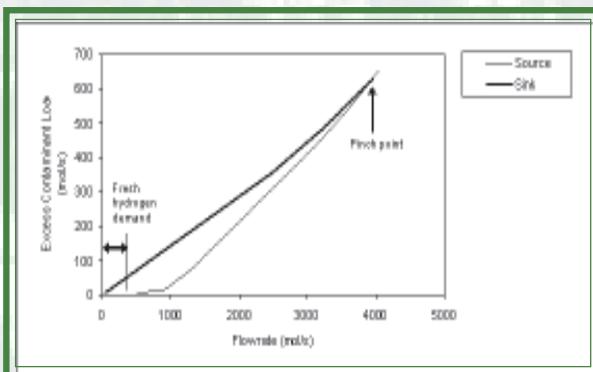


Figure 2. Graphical Solution of Case Study Using El-Halwagi's Method



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Predicting the Compressive Strength of RC Circular Columns Confined with Steel and/or Carbon FRP Using Neural Networks

Experiments have shown that passive confinement due to steel or carbon fiber reinforced polymer (CFRP) enhances the compressive strength of circular concrete columns. The accurate prediction of the ultimate confined compressive strength of concrete columns is very important especially when this value is used in estimating the capacity of structures. Since experimental data on confined concrete columns are readily available in the literature, it may be useful to combine and reanalyze them to develop empirical models that can give reasonable predictions of the confined strength of circular concrete columns. However, the many factors which affect the confined compressive strength of circular concrete columns makes modeling for predicting this confined strength difficult especially when both steel reinforcements and carbon fiber reinforced polymer (CFRP) are used as confining materials. The study presents modeling using artificial neural networks (ANNs) to predict the compressive strength of circular concrete columns confined with steel reinforcements and/or CFRP.

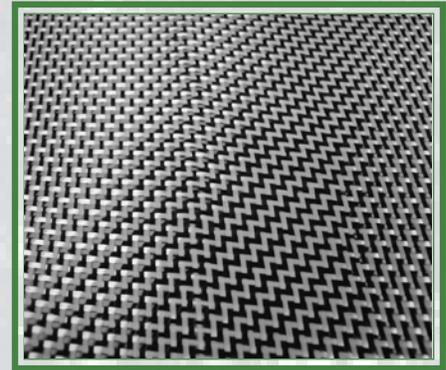


Figure 1. CFRP sheet

The effect of various factors such as P_s , P_{cc} , P_{CFRP} , L , d , D , f_{yh} , f_{CFRP} and f'_c are considered in the development of ANN models to predict the confined behavior of circular concrete columns.



Figure 2. Bridge retrofitting

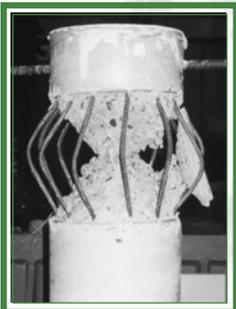


Figure 3. Column failure due to insufficient confinement



Figure 4. Installing CFRP at the site



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Perceived Organizational Effectiveness of Labor Unions in the Banking, Hotel, and Manufacturing Industries

A trade union is a continuing, permanent, militant, and democratic organization created and run by workers to protect themselves at their work, to improve the conditions of their work through collective bargaining, to seek to better conditions of their lives, and to provide a means of expression for the workers' views on the problems of society.

Unions, like any other organization, are composed of people, structure, processes and other resources utilized to achieve certain goals. These unions operate within a set of dynamic and complex macro external systems like the economic, social, political and legal environment. The reality that trade unions is one of the major actors in the industrial relations system makes such sector an interesting aspect to investigate.

The general objective of this research is to determine the extent of influence of the organization's context and structure factors on the perceived organizational effectiveness of labor unions in the banking, hotel, and manufacturing industries in the National Capital Region. It also compared the level of perceived union organizational effectiveness based on the type of industry where the unions belong. Lastly, the study identified other perceived qualitative factors that facilitated and/or hindered the effective performance of the union based on the five organizational indicators.

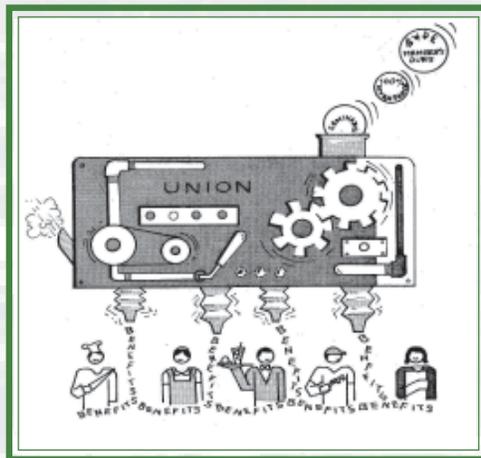
In this research, organizational effectiveness referred to the extent to which the union members believed that the union objectives are achieved, implemented activities per programs are adequate, duties, and obligations expected of members are complied with, members' relationship is cohesive, and the members are satisfied with the union as a whole. The perceived effectiveness of the union is measured as the mean (\bar{X}) response to the five organizational indicators using a 5-point Likert scale:

The specific model in this assessment effort is based on the work of Pugh, Pheysey, and their colleagues in the Aston group in 1972 which is a sociological approach to the study of organizations (Hausser, 1980).

A total of 88 local unions consisting of 772 rank and file and supervisory union members from 82 firms in the NCR were covered in the survey. The collected data were initially analyzed using descriptive statistics like the frequency, percentage, and means. To test significant difference in the mean ratings by type of industry, the ANOVA with F-test was applied. To determine the extent of influence of the context and structure factors on the level of union organizational effectiveness, the Stepwise Regression analysis was used.

It is evident from the results that the level of union effectiveness as perceived by the members is a function of two major organizational factors, namely, context (type of ownership, type of industry, and number of union members) and structure (number of years as union member). Moreover, there are significant differences in the average level of effectiveness rating of unions per industry. Unions in the hotel industry were rated highest, followed by those in the manufacturing and then the banking sector. However, it is interesting to note that across the three industries, the unions' average performance is very effective.

Based on the findings, the following recommendations are proposed to ensure that unions' effectiveness will substantially increase over the years to be able to continue protecting the workers' rights and representing them in collective bargaining negotiations with employers for increased wages, better benefits, and improved working conditions. Thus, eventually influencing the standard of living of Filipino working people and their families. These recommendations are strengthening union organizing and recruitment; institutionalizing tripartism and social dialogue; capacity building; and strengthening collective bargaining.



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Metacognitive Judgement in a Naturalistic Setting: Assessing Performance in Classroom Tests

By using real classroom evaluations, in two studies, the effects of metacognitive ability (high vs. low) and test type (multiple-choice vs. short-answer) on students' performances and monitoring processes in individual and in collaborative tests were investigated. Moreover, it was also assessed whether those effects would change over the duration of one academic term. Results revealed that 1) compared to their counterparts, high-metacognitive students presented more effective test preparation practices and attributional and regulatory processes. As a result, they presented better test performances and online monitoring; 2) over time, students' performances and monitoring processes varied in specific patterns according to the type of test being taken; and 3) collaborative testing had particular positive effects on groups of low-metacognitive students. Only the accuracy scores of groups composed of two low-metacognitive students showed a significant improvement from the first to the second short-answer tests. Consequently, their performances also improved. Results are

discussed focusing on the educational implications of the interaction of those factors and how it might determine how much students can learn from test-taking experiences.

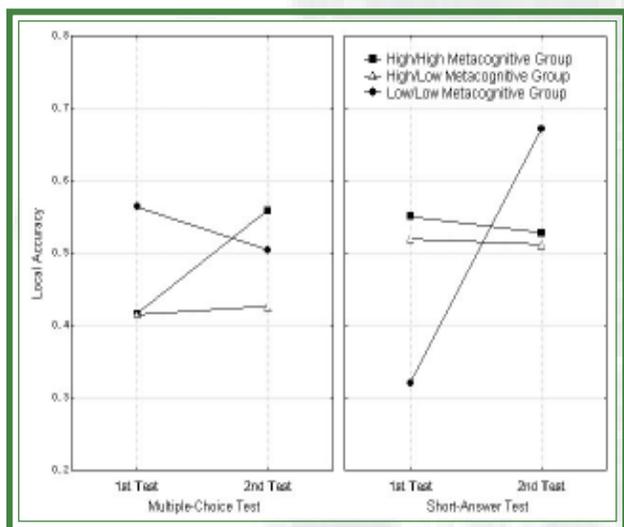


Figure 1. Effects of test type and metacognitive grouping on accuracy of collaborative tests over time.



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