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Testing inclusive interdisciplinary models on Internet dependence in Youth. New associated variables

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Abstract
Introduction: This article analyses and discusses when and why the integration testing of an inclusive interdisciplinary model explains and predicts the variable dependence on Internet in the Interactive Generation (IG). Methodology: The results are based on a sample of 4,563 young Mexicans and expose the validity of constructs and the relevance and consistency of the data and its explanatory relationship using a Confirmatory Factor Analysis (CFA) of multiple regressions. Results and conclusions: The relationship between factors guided by the theory is established to check the validity of disciplinary theoretical constructs that nourish both restrictive interdisciplinary models as the inclusive interdisciplinary model. Consequently, discuss, refine and articulate new research questions and unpublished relations between theory and practice through the generation of new associated variables.

Keywords
Communication, interdiscipline, Mexico, dependence, Internet.

Contents

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1. Introduction

This article aims to examine when and why the implementation of a general framework of relations and mainstreaming in the field of interdisciplinary research in communication studies, particularly for the process, analysis and learning of smart technology devices in young people. At first, the contribution seeks to justify when and why the application of an interdisciplinary research perspective is needed. The basic theoretical steps are then presented to implement a research perspective of this nature by exposing the interdisciplinary inclusive model and the consequent disciplinary theoretical contributions to the inclusive interdisciplinary model. It seeks to achieve a more explanatory understanding of mediated communication digital technologies in the new Mexican Interactive Generations (IG).

IG are the new generations who are born immersed in a globalized society characterized mainly by its interaction with the information and communications technology (ICT) and the knowledge society: the new generations of children and young people whose interactivity and exchange of communication with smart devices is for five fundamental axes in the production of meaning: communication, learning, sharing, entertainment and consumption (Leon et al, 2013; 2014; 2015). Finally, the contribution closes offering two specific analytical research perspectives which in our opinion should be central in an interdisciplinary study: first, describing the conceptual theoretical relationship of the factors of interdisciplinary inclusive model with exposure, testing and the validity of empirical data. It means to show the relevance and consistency of the data and its explanatory relationship with the study based on statistical data through a Confirmatory Factor Analysis (CFA).

On the other hand, this paper focuses on generating an innovative discussion of critical multiplism, restricted disciplinary models and inclusive results. It arises the need to scrutinize (and frequently change) terminology originally used by different contributing disciplines and also to think and to discuss a new theoretical-conceptual relationship with the associated variables. These variables are new technical terms resulting from the joint application of the factors that make up the main studied
variable and become integrated on the disciplinary theoretical contributions to the inclusive interdisciplinary model.

Thus, the text not only aims to establish the relationship between the factors guided by the theory but also allows to know the validity of disciplinary theoretical constructs that nourish the interdisciplinary model and consequently the reliability of the instrument that seeks to understand and characterize the IG in Mexico.

Also, the study presents a comprehensive explanation formulated on the interdisciplinary model and proposes a better ratio explanation, relevance and understanding of the theoretical contributions with the empirical data from the evaluated reality by observing the goodness of fit and the validity of the models.

The application of an interdisciplinary research perspective is needed when one or more disciplinary perspectives are limited in explaining the object of study, or better yet, when our social problem is so complex that it can definitely have a limited perspective on one or more specific disciplinary fields. Systems, phenomena or complex social problems are a necessary condition for interdisciplinary studies. It is stated, that the interdisciplinary research perspective in social studies can be an effective response when social problems are addressed profitably from a field and as part of a limited part of its complex system understanding.

For this reason, academia and researchers that aim to design and conduct interdisciplinary studies may help to better understand the social problem with the help of several disciplines or fields of study, working in an integrated manner. We understand that an effective method to explain the social problem must provide a detailed approach to every disciplinary facet. As well, carry out the whole process of self-organization and integration of features and complex pattern variables produced by the studied problem. By definition, the design of an interdisciplinary study should draw profound insights from the relevant disciplines involved but also seek to integrate those in a more comprehensive and inclusive model of understanding. This is what we have called the interdisciplinary inclusive model in the study of mediated smart communication technology (León, 2015).

Moreover, urban social problems in Latin American gain attention as the expansion of the world population living in cities. In the last decade, for example, it has seen a significant increase in research on social issues. Social sciences are being increasingly linked with anthropology, communication, psychology and other fields. Thus, in recent years, studies of technological innovation seem to gain attention, not only in studies of science and technology, which have been relatively segmented fields and separated from the disciplines that traditionally make up the social
and human sciences, but also in legislative or law studies, public policy, economics, among others (Craig & Tracy, 2014). It should be recognized that the interdisciplinary, multi and transdisciplinary trend in social studies has existed from the moment disciplines emerged. Sometimes they have formed the origin of new disciplines, including some that are not crystallized and eventually disappeared.

This internal cooperation dynamic and cross-fertilization between disciplines not only between the different fields of study make up the social sciences. It is also a feature of the interactions between the social studies and other fields of knowledge, especially in humanities and natural sciences (Silbereisen, Ritchie & Overmier, 2010). In natural and social sciences, it is widely accepted that each discipline focuses on a group of interrelated variables from each perspective. These variables can be easily seen as components of a system. If there is any consistency for each discipline, then the variables should be closer and directly related (or linearly related) between the studied variables and by other disciplines. To justify this, the object of study of the interdisciplinary perspective must be represented by a system that integrates them. If the connections between the different facets are predominantly non-linear, the system will develop more complex features. In relation with most contemporary interdisciplinary positions (see, for example, Patry, 2013; Klein, 2013; Meek, 2011; Newell, 2013; Repko, 2008; Szostak, 2013), our position is interested in guiding the understanding of interdiscipline in order to develop specific complex systems and studying their behavior. Particularly, acknowledging the position of human, infrastructure and organizational resources (among others) the interdisciplinary research group has in order to identify and give meaning outside the pattern of self-organization of the phenomenon presented by a particular complex system. For this reason, and from a wide position, we suggest, retaking the studies of Klein and Newell (1996), where they point out that interdisciplinarity is understood by scholars in the field of communication (and social sciences in general), as the process and organizational philosophy applied to scientific academic research. Particularly, as a process of design and research that allow to answer a research question, to solve a problem, or to deal with a subject that is too large or complex to be adequately addressed by a single discipline or profession. The interdisciplinary study therefore would draw on their own disciplinary perspectives and seek to integrate their knowledge through building a broader perspective study (León, 2015).

2. Method

This study is planned as a descriptive research because it seeks to measure and specify the properties, characteristics and profiles of the young people as well as test the relationship and the effects of the variable dependence on Internet using specific statistical methods. While our research includes two methodological phases and a comprehensive mixed approach that includes a combination of
quantitative and qualitative techniques, only the data of the quantitative analysis is presented to predict the variable dependence on Internet and conceptual theoretical relationship of the factors interdisciplinary inclusive model with the exposure of empirical data. Therefore, the text strongly exhibits the relevance and consistency of the data and its explanatory relationship study from the statistical data by the CFA.

From the selection of those restricted models, the text is pronounced to define and evaluate the contributions and disciplinary models that are more parsimonious by combining different restricted models and an inclusive interdisciplinary model. The relevance and consistency of the data was applied to a selected statistical sample and contemplated the application of 4,563 surveys applied to Mexican public secondary students in the state of Sonora, Mexico. The universe was 27,379 students. The sample was selected based on the representativeness of the universe and taking into account variables such as their distribution by sex, age and type of school, among others. To determine the representative sample the following parameters were used: Acceptable maximum error: 2%; Estimated percentage of the sample: 99%; Desired trust level: 99%; Size of the universe: 27,379 students.

The instrument is made up of 227 items and comprises more than 6 factors. The instrument is part of a macro study of Internet and interactive in Young Mexican public secondary variables measuring access, habits, skills, sociability, trust, risks and dependence on Internet relationships. Validity and reliability of constructs and instrument are included in this article, specifically the factors related to use, socialization, trust and dependence on Internet on youth. The factor “use” consists of 23 items, in which time, navigation services and content are stated. The second factor “socialization”, comprises 24 items, which indicates processes of interaction between peers, parents and children. The third factor “trust”, consists of 29 items measuring trust agreements between parents and children, family communication and interaction. Finally, “Internet dependence” consists of 21 items, which refer to the attachment to technological devices, particularly mobile devices, the continuous concern of connectivity - Internet usage time. In either case, the respondent must indicate how often the situation stated is presented using a Likert scale (0 = never, 1 = rarely, 2 = sometimes, 4 = almost always, and 5 = Always).

3. Theoretical perspective. Interdisciplinary approach in the study of the IG

When we approach studies such as Internet and interactive relationships of children and young minors with digital technologies in general, we can adopt several views on the phenomenon, different positions that allow a better understanding. Therefore, there is a need to integrate the debate to consider the disciplinary and interdisciplinary methodology from different dimensions that let the clarification of real possibilities, in order to analyze and explain a complex and multidimensional...
social phenomenon. As a result, a focused approach from a discipline is incomplete. A complex and multidimensional topic as the study of intelligent technological devices applied in educational contexts and social problems can hardly be worked without taking into account, psychological, sociological, communicational and educational variables (among others). This requires some dialogue between different disciplines. Shadish (1986, 1993) was the first theorist in contemporary social sciences to suggest critical multiplism (CM), the use of multiple theories, hypotheses, methods, researchers, disciplines and knowledge, in an attempt to explain a more accurate reality. He said that the combination of multiple strategies and visions eliminates the bias that presents each of them separately and also eliminates the intellectual favoritism for their own ideas. In any case, the question we raise is whether we can apply the approach of the CM or the implementation of the interdisciplinary research perspective in a better understanding of mediated communication digital technologies that new Mexican and Latin American IG perform. We also consider the explanation of everything from a unique perspective. The risk is reduced if the research approach has multiple perspectives, science can be regarded as unique, but with so many facets and boundaries (Shadish, 1993).

In Figure 1, we aim to express the dealing of emotions, habits, socialization, skills and traits and behaviors of the MIG and their own disciplinary nested models (restricted). What we are trying to
generate, from the characteristics that vary among this sample, are variables associated and mainly linked with the opportunities and risks of minor communication and its sense in their daily life through intelligent technological devices: learn, participate, play, work and socialize (among other activities). We recognize that the Internet can definitely aggravate the risks online of a minor and also develop negative experiences in children, such as, behaviors and activities that potentiate harassment, exposure to pornography, or the high dependence to the Internet of the minor which is known as Internet addiction disorder - (IAD), compulsive Internet (CIU) - or pathological Internet Use (PIU).

This inclusive model, which we have worked in several studies between 2013 and 2015, not only provides a special relationship addressed within each discipline, but also shows interactions between objects and the contribution of different fields (see figure 2).
What we are trying to generate, from the characteristics that vary among the participants are associated variables linked mainly to the opportunities and risks of communication and meaning through smart technology devices with Internet connection in their daily lives. Strategies development and implementation follow the proposed model of CM. As an example, the treatment of access and use, dependence (dependent variable) and trust, mainly grouped from the theoretical field of communication, developed 7 restricted models by the combination of one, two and three factors with the factor “dependence on Internet” to test the validity and reliability of the model. However, we have selected only those restricted models highly significant on CFA. On the other hand, those restricted models that were not significant to understand the complexity of the study were excluded (see figure 3).

The objective is to point out the conceptual theoretical relationship of interdisciplinary factors in an inclusive model with the exposure of empirical data by a CFA. As we already mentioned, we not
only seek to establish the relationship between the factors guided by theory, but to understand the construct’s validity and the instrument’s reliability. Thus, the construct’s validity determines whether the instrument measures what we intend to measure (Bechtel, Marans and Michelson, 1990), while the reliability indicates the consistency of the measurements (> .60) (Nunally and Bernstein, 1994).

In any case, it is essential that the most parsimonious model is the one with a greater explanation combining different models and their restricted integration to the inclusive model. Thus, as noted above, the present study intends to provide an understanding of the conceptual theoretical data with empirical data and analyze the relevance of theory to reality.

We can say that the conceptual definition that characterizes the dependent variable on the interdisciplinary inclusive model, dependence on the Internet, lacks theory that contributes substantially in the definition of the construct. However, their contribution and complementarity of previous studies helped us provide an operational definition of the concept. According to the study presented by Cao, Su, Liu & Gao (2007), dependence on the Internet has been known by different names as those outlined above (IAD, CIU, PIU). However, most of these names agree that Internet dependence is characterized by excessive concern (or poorly controlled) with the use of computers and Internet access, which leads to impaired person at different levels (personal, family or professional). Some theoretical contributions from dependence on Internet explain their relationship with access equipment technological devices, usage time and a constant concern when they are not connected, among others. In either case and in all its variants, all subtypes mentioned should comply with the following characteristics, according to studies by Block (2008):

a) Excessive Internet concern.
b) Need to increase the connectivity (online) to get the same satisfaction time.
c) Repeatedly effort to decrease the time of Internet use.
d) Irritability or depression.
e) When Internet use is restricted, emotional weakness is presented (Internet is presented as a form of emotional regulation).
f) Stay online more than the originally scheduled.
g) Work and social relations at risk by overuse.
h) Lying to others about the amount of online hours.

The variable dependence on Internet is very close to independent variables such as use and consumption, according to the contribution of Bringué, Sábada and Rodriguez (2008), to encompass everything related to access and use kids and teenagers make of digital media. The factor access and use includes technological equipment, access, time of day in which they use it or the amount of time they spend on them, and the contents and navigation services.
On the other hand, socializing is a process by which the individuals adopt the cultural elements of their environment and integrates their personality to adapt to society. In other words, socializing is the process that affects several aspects of development especially in children and adolescents such as growth, psychological and emotional changes and social integration (Berger and Luckman, 1983). Specifically, the process of primary socialization involves more than a purely cognitive learning. It is conducted under enormous emotional burden conditions. Certainly, there are good reasons to believe that without this emotional attachment, the learning process would be challenging, not impossible. Internalization occurs when the child identifies with others in a variety of emotional ways (Berger, 1997: 167).

4. Results

The relationship between factors determines the level of impact and approach between them. On Figure 3, the factor of access and use consisted on the variables of time, preferences and navigation services. It also predicts a relationship with the factor of Internet dependence with a structural coefficient (.72). The factor of socialization predicts in a greater extent an existing influence on Internet dependence with a structural coefficient (.93). Finally, the trust factor, predicted a relationship on Internet dependence with a structural coefficient (.89). As shown in Table 1, there were some significant differences between the inclusive model (including all factors) and the restricted model (consisting of one, two and three factors).

<table>
<thead>
<tr>
<th>Model</th>
<th>X²</th>
<th>gl</th>
<th>P</th>
<th>BBNFI</th>
<th>BBNNFI</th>
<th>CFI</th>
<th>RMSEA</th>
<th>R²</th>
<th>ALPHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interdisciplinary Inclusive Model (Access and use, socialization and trust explaining Internet Dependence)</td>
<td>54.99</td>
<td>24</td>
<td>000</td>
<td>.868</td>
<td>.878</td>
<td>.918</td>
<td>.081</td>
<td>.88</td>
<td>.709</td>
</tr>
</tbody>
</table>

Table 1. Interdisciplinary Inclusive Model and Restrictive Models
### Restricted Model 1
*(Access and use explaining Internet Dependence)*

<table>
<thead>
<tr>
<th>Factors</th>
<th>Cronbach’s Alpha</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device attachment</td>
<td>.714</td>
<td>8</td>
</tr>
<tr>
<td>Concern</td>
<td>.682</td>
<td>4</td>
</tr>
<tr>
<td>Usage time</td>
<td>.811</td>
<td>9</td>
</tr>
<tr>
<td>Pragmatic agreements</td>
<td>.913</td>
<td>14</td>
</tr>
<tr>
<td>Parent interaction</td>
<td>.800</td>
<td>9</td>
</tr>
<tr>
<td>Peer interaction</td>
<td>.913</td>
<td>10</td>
</tr>
<tr>
<td>Family time</td>
<td>.671</td>
<td>5</td>
</tr>
<tr>
<td>Social interaction</td>
<td>.786</td>
<td>8</td>
</tr>
<tr>
<td>Familiar communication</td>
<td>.638</td>
<td>7</td>
</tr>
<tr>
<td>Internet services</td>
<td>.713</td>
<td>8</td>
</tr>
<tr>
<td>Preferences</td>
<td>.782</td>
<td>6</td>
</tr>
</tbody>
</table>

### Restricted Model 2
*(Access, use and trust explaining Internet Dependence)*

<table>
<thead>
<tr>
<th>Factors</th>
<th>Cronbach’s Alpha</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device attachment</td>
<td>.714</td>
<td>8</td>
</tr>
<tr>
<td>Concern</td>
<td>.682</td>
<td>4</td>
</tr>
<tr>
<td>Usage time</td>
<td>.905</td>
<td>9</td>
</tr>
<tr>
<td>Pragmatic agreements</td>
<td>.834</td>
<td>14</td>
</tr>
<tr>
<td>Parent interaction</td>
<td>.923</td>
<td>.013</td>
</tr>
<tr>
<td>Peer interaction</td>
<td>.093</td>
<td>.87</td>
</tr>
<tr>
<td>Family time</td>
<td>.40</td>
<td>.622</td>
</tr>
</tbody>
</table>
5. Discussion. New associated variables

It has been shown that the interdisciplinary inclusive model represented by the variables of access and use, socialization and trust explains the relationship with the factor of dependence with an $R^2$ value of .88, while the restricted model 1 access and use explaining dependence is less explanatory an $R^2$ value of .40. On the other hand, it was found that the second restricted model access, use and trust explaining Internet dependence approached almost to a comprehensive explanation of the model with an $R^2$ value of .87 as the interdisciplinary inclusive model. Though, there are significant differences between restricted and inclusive models on the goodness of fit and validity.

Thanks to critical multiplism we conceive new associated variables from the selected ones as anchors to expand new knowledge from different disciplinary fields, and as a result we have an interdisciplinary research perspective.

“Sense of attachment and preference”, is fundamentally linked to the factors of access and use. It has been identified that young Mexicans socialize, share information and communicate through social networks. Yet, educational or academic use is not among its main uses and consumption. In our opinion this is one of the main challenges for those responsible for formal education in educational spaces. Mexican public schools are focused on developing digital skills, but definitely do not match with reality, young people preferences are based on contents related to leisure and entertainment. The vast majority considered themselves almost experts in the use of software and applications that allow them to create content, edit images, music, video and photography. They recognize, identify and use a variety of sites on which they can publish, share, comment and participate actively.

The task of interdisciplinary integration involves at least two major challenges that are closely connected: recognition of the general pattern of behavior of the studied phenomenon, and a complex system whose behavior pattern is consistent with the phenomenon addressed, and particularly with their relationships and components that comprise it. Newell (2001) identifies some techniques for interdisciplinary integration that have a broad applicability across a diverse range of complex systems within the field of communication studies. These include: redefinition of terms from different disciplines to determine coincidences; extension of the meaning or range of application of a concept; continuous creation of meaning between concepts from different disciplines can be selected; transformation of opposites disciplinary axioms in a continuous variable; reconstruction of inter relations subsystems to provide recognition followed by dependent variables, etc.
A second associated variable that allows the validity of the constructs and reliability of interdisciplinary inclusive model is linked directly with the factor of socialization and trust through the variables peer interaction, pragmatic arrangements between parents and children, interpersonal communication with family and interaction with parents or guardians. Peer socialization is identified by live conversations and concentrate high attention and interactivity especially when communication and socialization are made anonymously. A real concern in communicative interactions is the identity of the people with whom they interact. According to their responses, the presence of confrontation and when something did not seem well was through social networks. In fact, a factor of social exclusion comes from non-possession of an intelligent device (eg mobile or smart phone). Nowadays, Internet allows youth to extend its network of social relationships, meet friends and share interests. Hence, it is understood that social networks are places for self-expression, connection, interaction and where they consolidate their identity. In the period 2013-2015, it was observed that most teenagers have virtual friends. Several ways of interaction are constructed from their relationships on the Internet. A considerable percentage of students said that Internet enables communication. Likewise, they expressed that helps them save time. It was found that some characteristics of youth practices in virtual space consisted on uploading photos or writing journals; the minor generates opportunities for social judgment. In addition, peers also measure the opinions others have.

Finally, access and use and portability and accessibility of devices have accelerated the acquisition of a final associated variable identified as "pattern of behavior", which is, the overuse of smart devices 24/7, with a negative impact on school performance, physical and mental health, and the youth’s behavior and emotional state that appears as an adaptive reaction or changing response to different situations. Data, from the quantitative study applied to male and female students of public secondary schools in Mexico, linked boredom with having “nothing to do”, and they say it is easier to distract or entertain in social networks. We were able to document that adolescents develop anxiety levels considered by them as “normal” because they believe being connected to a smart device encourages them to develop new relationships in their daily life as teenagers.

6. Conclusions

Interdisciplinary research seeks to draw a certain contribution and it is highly likely that you may find greater wealth in research by presenting and testing the theoretical construct from different fields’ perspective. Restrictive and inclusive interdisciplinary models and their mechanisms tend to become invisible when all members of the interdisciplinary team present the most effective way to
test the usefulness of a discipline by probing, comparing and nesting the different models.

In our view, this set of strategies denotes the base of critical multiplism contribution by exposing the conceptual theoretical relationship of the factors that make up the interdisciplinary inclusive model with the exposure and validation of empirical data explaining and predicting the variable dependence on Internet. Thus, the validity and reliability of our main variable was highly reliable. As a result, the comparison of the models was remarkable, significant differences were observed between restricted and inclusive measuring the goodness of fit and the validity of the models. Finally, critical multiplism has allowed us to explore the analytical factors contributing on the design and understanding of relevant issues in the IG in Mexico; to refine and articulate new research questions; and also generate new relationships between theory and reality from different disciplines and fields having as a result the application of an interdisciplinary research perspective.

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