

A close-up photograph of a field of tall grasses with reddish-brown seed heads. A small, light blue butterfly is perched on one of the stalks in the upper center of the frame. The background is a soft-focus field of similar grasses.

# SILLIMAN JOURNAL

VOLUME 58 NUMBER 2 | JULY TO DECEMBER 2017

**A JOURNAL DEVOTED TO DISCUSSION  
AND INVESTIGATION IN THE HUMANITIES AND SCIENCES**

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DISCUSSION AND INVESTIGATION  
IN THE HUMANITIES AND SCIENCES

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The Silliman Journal is published twice a year under the auspices of Silliman University, Dumaguete City, Philippines. Entered as second class mail matter at Dumaguete City Post Office on 1 September 1954.

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ISSN 0037-5284

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Annual subscription rates are at PhP600 for local subscribers, and \$35 for overseas subscribers. Subscription and orders for current and back issues should be addressed to

**The Business Manager**

Silliman Journal  
Silliman University Main Library  
6200 Dumaguete City, Negros Oriental  
Philippines

Issues are also available in microfilm format from

**University Microfilms International**

300 N. Zeeb Road, Ann Arbor  
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Other inquiries regarding editorial policies and contributions may be addressed to the Silliman Journal Business Manager or the Editor at the following email address: [sillimanjournal@su.edu.ph](mailto:sillimanjournal@su.edu.ph).

Or go to the SILLIMAN JOURNAL website at [www.su.edu.ph/sillimanjournal](http://www.su.edu.ph/sillimanjournal)

Book design and Layout by Rigel dela Cruz Suarez  
Cover Photo "*Sign of Life*" by Rigel dela Cruz Suarez  
Printing by SU Printing Press, Dumaguete City

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## Publication Guidelines

**S**ILLIMAN JOURNAL welcomes submission of scholarly papers, research studies, brief reports in all fields from both Philippine and foreign scholars, but papers must have some relevance to the Philippines, Asia, or the Pacific. All submissions are refereed.

SILLIMAN JOURNAL is especially receptive to the work of new authors. Articles should be products of research taken in its broadest sense and should make an original contribution to their respective fields. Authors are advised to keep in mind that Silliman Journal has a general and international readership, and to structure their papers accordingly.

SILLIMAN JOURNAL does not accept papers which are currently under consideration by other journals or which have been previously published elsewhere. The submission of an article implies that, if accepted, the author agrees that the paper can be published exclusively by the journal concerned.

Manuscripts of up to 10,000 words, including tables and references, should conform to the conventions of format and style exemplified in a typical issue of Silliman Journal. Documentation of sources should be discipline-based. Whenever possible, citations should appear in the body of the paper, holding footnotes to a minimum. Tables must be held to a maximum of five. Pictures or illustrations will be accepted only when absolutely necessary.

All articles must be accompanied by an abstract of 200 words and keywords of not more than ten words, and must use gender-fair language.

SILLIMAN JOURNAL likewise welcomes submissions of “Notes,” which generally are briefer and more tentative than full-length articles. Reports on work-in-progress, queries, updates, reports of impressions rather than research, responses to the works of others, even reminiscences are appropriate here.

SILLIMAN JOURNAL also accepts for publication book reviews and review articles.

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*“Boldness in business is the first,  
second, and third thing.”*  
- **Thomas Fuller** (*Gnomologia*, 1732)

*“In democracies, nothing is more great  
or more brilliant than commerce: it attracts the  
attention of the public, and fills the imagination of  
the multitude; all energetic passions  
are directed towards it.”*  
- **Alexis de Tocqueville** (1835)

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## Editorial Notes

*“The flesh endures the storms of the present alone,  
the mind those of the past and future  
as well as the present.”*  
- **Epicurus** (4th to 3rd c BC)

*“We abuse land because we regard it as a com-  
modity belonging to us. When we see land  
as a community to which we belong,  
we may begin to use it with love and respect.”*  
- **Aldo Leopold** (quoted in Stewart L. Udall's  
*The Quiet Crisis*, 1963)

**W**elcome to the second issue of Silliman Journal for 2017. The papers in this issue are multidisciplinary in nature; you should be able to find something of interest in more than one of these, no matter what your field might be.

This issue begins with our colleagues from Rothlin International Management Consulting who write from the perspective of international business ethics using as case study the controversies surrounding Alibaba Group Holdings and its IPO (initial public offering) applications in Hong Kong and New York. In today's demand for greater transparency, the authors ask hard questions including, Is transparency a moral absolute? If not, what are its limits? If it is a means, what ends must it serve? The authors conclude their analysis in this way: Transparency can become more apparent than real, unless one is sincerely committed to the basic principles of mutual respect, reciprocity, and inclusiveness, without which the trust necessary to conduct business will quickly evaporate. There will always be a need for moral leadership in business, since markets cannot and do not police themselves. They must be regulated to insure integrity, but it is also up to individual participants to be vigilant.” They add, “if claims to transparency are to be credible, they must be based on a demonstrated willingness to cultivate the moral virtues that sustain it.”

The next two articles are by researcher-faculty who demonstrate how information technology can help facilitate learning and academic operations. First, Dave Marcial shows the usefulness of a portable USB-based learning management system that may be used even without Internet connection. Then, Jonathan Te and Albert Rivera developed and tested a support system to assist in the decision to grant scholarships to first year students at Silliman University. The system's features were found to have worked as originally intended.

In the fourth study, Barbara Lyn Galvez and colleagues investigated "The effect of clinical simulation on the cognitive learning abilities of undergraduates of Silliman University College of Nursing", but found the strategy irrelevant to learning.

The next two studies are by psychology faculty-practitioners. Michele Valbuena and others explored incivility as experienced by Silliman University personnel. Rationalizing that "Incivility in the workplace has become of interest in industrial/organizational psychology research to understand employee welfare and design programs to develop employee wellbeing," the authors utilized a mixed method design to measure personnel experiences of incivility and how these were related to burnout. Limitations of the study indicated that the personnel did not understand what incivility really was, misconstruing the behaviors as bullying, leading to inconsistency in the data between the quantitative and qualitative methods.

Then, in anticipation of the passing of the Mental Health Law in the Philippines, a case study was made of the province of Negros Oriental in terms of mental health services and availability of mental health practitioners trained in the discipline. The situation was found to be rather bleak, with many professionally licensed but not in mental health work while those in mental health facilities lacked training and needed to be empowered.

The last three full-length articles come from the natural sciences; two are by frequent contributor Annie Paz-Alberto and her colleagues—one on animal diversity in a forest ecosystem in Nueva Ecija, Northern Philippines, the other on IEC and Technology Transfer for Biodiversity Conservation and Utilization in Central Luzon. The authors observed 53 animal species in the area; a bird species *Cinnyris jugularis* was the most dominant animal species surveyed in the forest ecosystem. In addition, six

species were listed as vulnerable while three species as near threatened. Thus, the authors' second study was conducted to enhance public awareness on the importance of biodiversity, given that information education communication or IEC is a potent tool in biodiversity conservation.

Finally, Riza Abilgos-Ramos and others analyzed the nutritional composition and antimicrobial properties of Chili Pepper (*Capsicum* sp.) leaves, concluding that chili pepper leaves as a food ingredient are a substantial source of micronutrients and its dried and powdered form can be incorporated in many food preparations.

## REVIEW SECTION

The lone review in this issue is by Ivane Mahinay who writes on “Horror Fiction and the Rhetoric of Release in *Waking Up the Dead and Other Horror Stories*”. The latter is a collection of ten short stories by Filipino writer Yvette Tan (published in 2009). According to Ivane, all the stories “deal with horrors not always supernatural and are set in a reimagined past, a parallel present, or a projected future—but all are recognizably Filipino, from the beliefs and rituals that inform the stories to the concerns and societal ills they try to grapple with and resolve.” Ivane invites us to read the stories by ending with the following: “Yvette Tan in *Waking the Dead and Other Horror Stories* writes in the three main modes of horror—the moral allegory, psychological metaphor, and ambiguous fantastic—to render the many forms of dread; she uses elements in our culture, from mythological creatures to urban legends, to historical trauma, and to local customs and rituals, to create horror fiction that is distinctly Filipino; and she uses the themes of vanity, grief, desire, and guilt, among others, to tell stories that have universal appeal. But it is in her ability to dissect and get to the heart of our modern-day fears and anxieties, and the resolution she affords us, no matter how temporary, that is the book’s final and best offering.”

## ACKNOWLEDGMENTS

I acknowledge with gratitude all contributors to this long and diverse issue, including the reviewers for the articles and my editorial staff. Rousseau, in Emile (1762) said, “Everything is perfect coming from the hands of



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the Creator; everything degenerates in the hands of man.” So it seems not only in business and in matters concerning our mental health, but also the well-being of our physical environment.

Thus, I end these notes with the words of Edwin Way Teale who said, in *Circle of the Seasons* (1953), “The long fight to save wild beauty represents democracy at its best. It requires citizens to practice the hardest of virtues—self-restraint.”



Margaret Helen F. Udarbe  
Editor-in-Chief

# SILLIMAN JOURNAL



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# Transparency: A Necessary First Step toward an Ethic of Finance

Stephan Rothlin, Dennis McCann, and  
Thomas Myers

*Rothlin International Management Consulting  
Beijing and Hong Kong*

The demand for greater transparency is a hallmark of today's efforts to promote international business ethics, especially in global financial markets. But what is transparency? Is it a moral absolute? If not, what are its limits? If it is a means, what ends must it serve? Is it possible to have too much as well as too little transparency, especially as it is institutionalized in financial markets? The following is an attempt to address these questions, in light of a particular case study, namely, the controversies surrounding Alibaba Group Holdings and its IPO applications first in Hong Kong (HKSE) and then in New York (NYSE). The authors conclude that, in promoting the Alibaba IPO and related ventures, Jack Ma asked for the trust of investors and other stakeholders, without achieving a robust transparency that would clearly warrant that trust. The authors are concerned to integrate legitimate demands for transparency into an ethic of finance that, while respecting Asian cultural values, also facilitates Asian business development internationally.

**Keywords:** accountability, Alibaba IPO, asymmetrical relationships, disclosure rules, guanxixue, investor rights and responsibilities, reciprocity, social capital, transparency, trust

## INTRODUCTION

**A**n underlying cause of the crisis that rattled world financial markets in 2008 was the deterioration of trust—or if you will, the erosion of social capital—necessary for financial institutions to function properly. The loss of

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trust, we believe, was the result of the collective sabotage of basic standards of transparency tolerated, if not actually encouraged, by the relaxation of the financial regulatory schemes that had emerged in response to the Great Depression (e.g., Glass-Steagall Act). To be sure, the relaxation of these standards was promoted, at one point, as necessary to “stabilize” financial markets in the aftermath of 9-11. But once the regulations were relaxed—a process that had begun well before 9-11—all too many in the financial community became indifferent to the systemic need for accountability through transparency so long as they continued to earn high returns through a variety of new and mostly unregulated financial instruments.

As Wall Street’s increasingly risky ventures culminated in an inferno of predatory lending and other irresponsible practices, transparency remained relatively unknown, or untried, in Asian financial circles. While many Asian institutions managed to evade the worst consequences of the financial crisis, some began to feel pressure from the public at large over their lack of transparency. Suspicions grew that major banks in Hong Kong, for example, were caught in cover-ups of their own involvement in predatory practices. Recall that the original Occupy Central protests<sup>1</sup> in Hong Kong were galvanized by the activities of the HSBC as well as Hang Seng Bank in deliberately marketing toxic assets, created as part of Wall Street’s innovative investment schemes. The need to restore trust in the financial markets therefore seems universal and is not simply a conundrum for Wall Street.

If this need is to be met, a restoration of the public’s trust in financial markets must be achieved, which can only result from the development of new standards of transparency and accountability. But how is that to be done? This is the argument of our article: We begin with a case study on the controversies surrounding the Alibaba IPO, since these raise questions about appropriate standards of transparency in businesses whose shares are publicly traded. Jack Ma, Alibaba’s founder, has also portrayed himself as not only committed to high standards of business ethics but also as a “Confucian entrepreneur”, a living witness to the traditions of Confucian ethics in business.<sup>2</sup> We need to examine critically Ma’s claims to moral leadership. Do his practices measure up to the standards of transparency and accountability required to sustain the trust of his various stakeholders?

A useful place to begin may be to explore the very notion of transparency, highlighting its nature and limits, as well as its historic origins and development. In order to establish the indispensable role of

transparency, especially in a globalized marketplace, we go on to examine a range of cases in which transparency is sabotaged, through either excess or defect. We will argue that, since transparency is merely a means to an end—namely, the establishment of sustainable relationships of trust—it is possible to have both too little and too much of it. Finally, in light of Jack Ma's own success in developing a reliable ecommerce platform, we hope to show how transparency can be embraced as a universal value and integrated into Asian business practices.

## **THE ALIBABA IPO: GOING ALONG FOR THE RIDE?**

Despite the apparent initial success of the Alibaba IPO on the New York Stock Exchange<sup>3</sup>, in the year or more since then, Alibaba has remained controversial in light of certain allegations regarding (1) Alibaba's failure to monitor its Taobao marketing platform for fraudulent activity, that is, Alibaba's failure to control, if not eliminate trafficking in counterfeit merchandise; (2) unresolved confusion over the relationship of Alipay, the online payment platform, with its parent company, Alibaba; and (3) the nature of the firm's corporate governance structure and its compliance with PRC regulations regarding foreign ownership of Chinese companies. Each of these allegations deserves a closer look, if we are to understand the challenge of sustaining trust through increased accountability and transparency.

1. Problems with Taobao: The allegations regarding fraudulent activity on the Taobao platform involve not just negligence but also corruption. Alibaba managers are alleged to have taken bribes in order to certify the legitimacy of vendors and their merchandise for sale on the Taobao platform<sup>4</sup>. While Alibaba has promised vigorous action to clean up the corruption, the Chinese government's State Administration for Industry and Commerce (SAIC) issued a report criticizing the firm's practices. The SAIC report was challenged by Alibaba for its methodology and bias, and after a meeting with Jack Ma, the agency withdrew the document, while also declaring that Alibaba was making "good efforts in safeguarding consumer interests". Nevertheless, international agencies representing firms that have been the victims of counterfeit production sold on Taobao—for example, the American Apparel & Footwear Association (AAFA)—have continued their protests and sought to

have Alibaba placed on the US Trade Representative's "Notorious Markets List"<sup>5</sup> for its failure to address the problem. Clearly, there is no trust between Alibaba and the AAFA, who protested the alleged lack of transparency in Alibaba's dealings not only with Taobao but also with the agency (SAIC) that is supposed to be regulating its activities.

2. Paying for Alipay:<sup>6</sup> The agency that Alibaba established to facilitate online payments on its various platforms is now known as Alipay, which has become extraordinarily successful in its own right. As Alibaba was in the initial phases of its rapid expansion, it persuaded foreign investors in 2005, notably Yahoo—as well as the Japanese firm Softbank—to provide the lion's share of the capital needed to fund Alipay, in exchange for seats on the board. At that time, Yahoo acquired a 40% stake in the Alibaba Group. Later in 2010, the People's Bank of China (PBoC) issued new rules for such third-party online payment companies, requiring their licensing. Although the regulations did not directly target foreign ownership of such businesses, in 2011, Jack Ma announced that Alipay would be spun off into a separate company, claiming that it was required by the new rules. His ownership stake in the new Alipay was set at 46%. Yahoo was not informed of the spin-off until 5 weeks after it happened, and when it was so informed, the announcement occasioned a 12% drop in the value of Yahoo's shares. The prospectus for the Alibaba IPO makes confusing reference to this set of events, and the issue remains unclear, with Jack Ma apparently promising to reduce his stake in the new Alipay company (Small and Micro Financial Services Company — SMFSC), and have it listed in a planned, exclusively Chinese IPO. The lack of transparency in the Alipay spin-off meant that, at least in the short-term, Yahoo—one of Alibaba's senior partners—felt that it had been blindsided, unable to protect itself or the interests of its shareholders. Eventually, however, Yahoo made out very well by sticking with Alibaba, but at that time, it was left with little or no way to manage its partnership.
3. What's Disclosed and What's Not in the Alibaba IPO: That Jack Ma's activities sometimes provoked accusations involving conflict of interest, as in such deals as these, ultimately raises questions about the Alibaba Group's corporate governance structure. Were Alibaba's accountability to its investors structured conventionally, investors could raise questions

about such deals through the company's Board of Directors. But Alibaba's corporate structure involves both a VIE (a "variable interest entity") consisting of the firm's actual enterprises—and a WFOE (a "wholly foreign-owned enterprise"), which in this case is a holding company through which investors may receive profits from the VIE's activities but have no direct control over it.<sup>7</sup> The Alibaba IPO undertaken at the NYSE sold shares in a Cayman Islands entity that is the holding company or WFOE. This means that the Alibaba Group in whose name the NYSE IPO was transacted is a WFOE, which provides capital funding for Alibaba's further development in exchange for a contractual promise that some portion of the VIE's equity interest—the profits from its businesses—will be distributed through the WFOE to its shareholders. While the VIE/WFOE structure is complicated, it clearly indicates that those who invest in the Alibaba IPO cannot expect to exercise direct control or normal oversight over the activities of Alibaba's actual businesses. They are limited to a share in whatever profits (or losses) are transferred from the VIE to the WFOE.

Needless to say, the corporate governance structure for the Alibaba Group remains both controversial and opaque. On the one hand, there is concern that the PRC regulatory authorities might crack down on such VIE/WFOE structures, rejecting them as an attempt to evade restrictions on foreign ownership of businesses operating in China. If the regulatory authorities were to reject the Alibaba Group's governance structure, it is anyone's guess what that would do to the value of the shares sold in the IPO. On the other hand, the decoupling of shareholding from the normal rights and responsibilities of business ownership undermines conventional standards of accountability and transparency, leaving disenchanted WFOE investors with no recourse except to sell their shares and move on. In effect, the Alibaba IPO investors are left with the choice of trusting Jack Ma and his leadership team, or else. They must trust but without any realistic hope of verifying independently the accounts that will be made to them, as the businesses develop.<sup>8</sup>

A year earlier, the Hong Kong Stock Exchange (HKSE) had rejected the Alibaba Group's attempt to do the IPO in its market but for reasons indicating a different problem of transparency. Although the HKSE was not enthusiastic about the VIE/WFOE structure, it turned down the IPO



because the two-tiered governance structure specific to the WFOE runs contrary to the exchange's rules. This arrangement enabled the existing management of the Alibaba Group—Jack Ma and some 28 partners—to name a majority of Board Members in spite of the fact that the partners would hold only a minority of the shares in the WFOE. The HKSE observed that this arrangement contradicted its “one shareholder, one vote” rule, and it would not make an exception for the Alibaba Group since this might cast doubt upon its commitment to the rule of law.<sup>9</sup> When the NYSE accepted the IPO that the HKSE had refused and along with it the WFOE's two-tiered governance structure, it looked as if Hong Kong's principled commitment to the rule of law had triumphed over the kind of greed that Wall Street accepted as part of “business as usual”.

Since both exchanges, in theory, are committed to protecting the interests of investors, how can their different rulings be understood, if not on moralistic grounds? At bottom, they concern two different approaches to transparency and accountability.<sup>10</sup> The NYSE assumes that current disclosure requirements are sufficient to ensure transparency, in a situation where investors can always sue the firm if those requirements are ignored or violated. The HKSE, on the other hand, operates in a business culture, as Stephan Mulrenan pointed out, that is “dominated by family run businesses and tycoons and has a higher-than-usual ratio of retail investor participation”. According to Mulrenan, “its one-share-one-vote guarantee [is] designed to protect retail investor interests”. If accountability is to be ensured—given the business culture of Hong Kong, where transparency is more apparent than real—it must come through the rigorous enforcement of regulatory requirements, such as “one-share-one-vote”. Though the HKSE itself tried to ease this rule in order to facilitate the Alibaba IPO, the Securities and Futures Commission (SFC)—Hong Kong's financial regulator—refused, and Jack Ma understandably took his business elsewhere.

The divergence between the NYSE's decision and that of the HKSE should not be overdramatized, as if the NYSE is merely running a casino and the HKSE is the only market concerned with protecting investors. A careful reading of the prospectus that the Alibaba Group issued for its NYSE IPO indicates no attempt to cover up the nature of the company's governance structure or to hide the risks involved in the Alibaba Group's business plan going forward. These things are stated clearly and listed in several pages that seem likely to exhaust readers, even potential investors. If “Caveat Emptor”

still applies generally to business, then investors have no one to blame but themselves for failing to do due diligence in assessing the risks involved in the Alibaba IPO. Everything is hidden in plain sight, thus leaving investors with a formal transparency in which Alibaba's risks are described generally but not weighed according to their relative importance. Lacking robust transparency in which the risks are exposed to realistic evaluation, investors must content themselves with Jack Ma's personal appeal for their trust. He should be trusted to perform well on their behalf because his efforts have already been crowned with extraordinary success. The formal transparency required by SEC rules for IPO filings may have been fulfilled. But left unfulfilled is the kind of robust transparency that could be ensured by an open governance structure. The contrast between formal and robust transparency reflected in the diverging decisions of the exchange regulators in New York and Hong Kong regarding the Alibaba IPO gives us one more reason to probe more deeply the nature of transparency, its limits, and possibilities.

## **TRANSPARENCY: WHAT IT IS AND WHY IT CANNOT BE FAKED**

Transparency, first of all, is a metaphor. If is living rather than dead, it should challenge us to do some fresh thinking.<sup>11</sup> Like a looking glass transparency allows us to see through something, in order to obtain better information, for the sake of greater clarity. Transparency is like the mirror in a telescope or a microscope. It enables the viewer to capture whatever light illuminating the object under investigation so that its specific features can be identified and understood. One thinks of Galileo and his telescope aimed at the moon or nearby planets. One thinks of van Leeuwenhoek and his breakthroughs in the study of microorganisms.

Transparency, as it is understood today in relation to business and other social organizations, emerged from early modern Europe's fascination with the natural sciences, and the expectation that the clarity achieved in them through technologically enhanced capacities for precision in measurement could also be achieved in the management of social institutions, such as the State, the Church, and other associations that constitute civil society. The European Enlightenment proposed the idea of a rational society, that is, one in which the standards of transparency developed in the natural sciences could be extended to the operations of society as a whole, thus enabling the triumph of democracy and human rights and the emancipation of

the productive capacities of all peoples.<sup>12</sup> Transparency, in short, stood at the core of the European Enlightenment's social vision, the indispensable precondition for establishing a rational society, that is, one in which the public sphere would be governed by a genuinely rational consensus based upon a generalizable interest in human emancipation or freedom with justice for all.

As the history of the French Revolution, and all subsequent revolutionary movements up to and including the recent "Arab Spring" have shown, the desire for transparency far exceeds anyone's capacity to achieve it. Human beings are never fully transparent (Gadamer, 1989). Whatever reflections we do inevitably generate distortions, the creation of blind spots, and the proliferation of obscurities along with whatever clarity we are able to achieve. The metaphor of transparency thus has its limits when it comes to persons and their social interactions. Neither we are transparent to ourselves nor do our attempts at communicating with others ever yield the kind of transparency that the European Enlightenment hoped to achieve in the public sphere.

A realistic analysis of communicative interactions among persons suggests that, whenever we attempt to make something transparent—including ourselves—we are also involved in making other things opaque. For every successful disclosure of one thing, there is an overshadowing of something else. In revealing, we conceal.

Even numbers are never fully transparent; they must be interpreted, if they are to communicate meaning to another. The dialectical nature of our attempts to discover and disclose truth need not be understood as evidence of immorality or human depravity, as if the limits to transparency were simply a reflection of willful secrecy or the intent to deceive. We are finite beings, who can never become fully transparent, at least not in this world, if not in the next. Given the impossibility of achieving total transparency, should we abandon the attempt altogether? There is no need to go that far. What we must do instead is recognize the limits to transparency, which means respecting the diversity of human cultures and societies, in which the ongoing dialectic of disclosure and secrecy unfolds in many different ways, each of which is worthy of consideration and respect.

Such philosophical reflections may help us to understand both the possibilities and limits of transparency specifically in business transactions. The GAAP rules, for example, are meant to achieve accountability through

the enforcement of common rules of disclosure or corporate transparency. But as anyone who has ever worked with them in a business must know, GAAP rules must be interpreted, and they allow a skilled interpreter—usually a professional accountant—considerable leeway in determining what is and is not to be disclosed, when it is disclosed, to whom and for what purpose(s). The discretion exercised by professional accountants does not mean that GAAP rules can be used to deceive others (by lying, cheating, or stealing) or deliberately to misrepresent materially significant information. Nevertheless, they do provide a variety of options on how to present the truth, transforming it into information that addresses the client’s need to communicate with those to whom his or her business is accountable, namely, its stakeholders.

The normative ideal of transparency, then, must fulfill its limited purpose in a variety of contexts. If it is not a moral absolute demanding compliance in all interactions within the public sphere, what can we reasonably expect from it? First of all, transparency is a means to an end, not an end in itself. That end can be defined as the establishment of trust, one type of which is indicated in the term usually associated with transparency, namely, accountability. Merely formal transparency, such as that offered in the Alibaba IPO prospectus, may comply with the standards of the SEC regulating the NYSE; but it is unlikely to create the kind of trust that flows from genuine and open accountability. How then would robust transparency be more likely to generate trust and accountability?

Ethical reflection on the nature of transparency—namely, that transparency is not an end in itself but a means and therefore subject to all the cautions built in to an ethic of responsibility—enables us to determine a Golden Mean in transparency intending, if you will, a “Goldilocks standard” of not too much and not too little, neither excess nor defect. The question, ethically considered, then is not whether transparency but how much transparency, for what purpose, for what set of stakeholders each with distinct claims to full disclosure.

In the case of the Alibaba IPO, for example, if I am an investor who receives a prospectus inviting me to become a shareholder, I have a right to know what is being done by management with my funds, a right to review management’s decisions so that I as an owner (shareholder) may participate in the governance of our company.<sup>13</sup> What I need to know, in order to act responsibly as an owner, may be different from what the news media needs

to know in order to report on our company's progress, or what government regulatory agencies need to know in order to verify that our company is operating within the rule of law that it is their responsibility to enforce. A degree of transparency is owed to each of these stakeholder groups so that they can carry out their responsibilities in trust and confidence. But that does not mean that the news media or the government needs to know or has a right to know everything that the shareholders—or their representatives on the Board of Directors—as well as top management should know. The actual practice of transparency requires the wisdom that we identify with integrity or moral leadership, particularly, the virtues of prudence and justice (and of course their equivalents in Confucian ethics)<sup>14</sup> that enable a responsible entrepreneur to discern what should and should not be disclosed, what should and should not remain hidden; all of which is governed by the need to establish appropriate levels of trust and accountability, without which markets cannot function properly.

If transparency is to go beyond formal compliance and move toward something more robust, we may have to outgrow the metaphors with which it was originally conceived in the European Enlightenment. If transparency is a means to an end, and not an end in itself, we must get clear about what that end really is, namely, the achievement of trust through truthfulness, signaled through gestures of reciprocity or mutual respect. Given the asymmetries normally encountered in human relationships,<sup>15</sup> especially in the relationships between a business and its diverse stakeholders, genuine moral leadership entails an anticipation of the needs of others (Levinas) whose satisfaction establishes conditions of mutual empowerment. The end, in short, is the achievement of genuine reciprocity, which can only grow in a relationship of trust.

If this is what a robust or substantive transparency requires, we can readily see how inadequate the stipulations of the Alibaba IPO—to take but one example—really are. The risks to which investors may be exposed, as listed in the prospectus, may be exhaustive as well as wearying. But in their vague generality they do nothing to establish reciprocity or mutual empowerment between the company and its stakeholders. They amount to an ultimatum: take it or leave it. Jack Ma may say, “Well, I’ve informed you what the risks may be; so don’t come crying to me, if you now find yourself a loser because you trusted your money with Alibaba. Get over it.” Robust transparency cannot and will not be satisfied with such a minimalist view of moral leadership.

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## **WHAT TRANSPARENCY IS NOT: WHAT HAPPENS WHEN TRANSPARENCY FAILS TO ACHIEVE ITS PURPOSE THROUGH EITHER EXCESS OR DEFECT?**

We learn, perhaps through bitter experience, that transparency as such provides no silver bullet disposing of all problems of accountability in business. Transparency, once uncoupled from the utopian agenda of the European Enlightenment, is merely a means to an end. As such, the requirements of transparency may vary according to circumstances, with accountability calibrated to the needs of different stakeholders. In such situations, where asymmetrical relationships are the rule, rather than exception, ethical responsibility means trying to establish a Golden Mean, distinguishing the practice of virtue from everything that falls short of it. If there is a Golden Mean in transparency, then we can miss the mark by having either too much or too little of it. When and how does too much of it negate transparency, and when and how does too little of it yield the same result? Answering these questions may provide major clues as to what transparency is and is not.

Can there ever be too much transparency? Before you dismiss the question, consider the forms of surveillance—both public and private—that raise objections these days. One example might be the use of new body scanning technologies for purposes of enhancing airport security. If transparency were an absolute good, why would anyone ever object to an explicit and full exposure of his or her body? Why are some groups more sensitive to the need for modesty, that is, appropriate covering of what is still best described as their “private parts”? Is it sufficient to dismiss the protests of those offended by the new scanners by saying, “What’s the harm? If you have nothing to hide, you have nothing to worry about.” Such questions, among other things, fail to observe the limits imposed by a proper respect for human dignity and the many asymmetries in relationships between individual persons and powerful institutions exercising such capabilities.<sup>16</sup> Arguably, the possibility of too much transparency is significantly increased with the widespread adoption of surveillance programs based on digital communication technologies. The voracious appetite of governments and business corporations for data—including so-called “Big Data”—for purposes of national security or innovative marketing has raised serious concerns that the right to privacy has become moot, in an age where access to information is

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virtually unlimited.<sup>17</sup> In exploring whether an organization might limit its own attempts to acquire as much data as possible on their clients, customers, and other stakeholders, the only restraint seems to be the fear of an unknown “ick factor”, that is, the possibility that those who have been rendered transparent involuntarily in the processes of accessing and analyzing data might actually rise up in revolt against these incursions. Perhaps the price of ignoring the human dignity of others may still deter some excesses. The right to privacy may not yet be as obsolete as technical capabilities alone might suggest.

Ethical reflection on the Alibaba Group’s IPO prospectus, for example, may suggest how too much transparency inevitably becomes no transparency at all. The prospectus features several pages of fine print listing in general terms the risks that investors should weigh in deciding whether to buy shares in the Alibaba Group. It is unlikely that any investor, even institutional investors, will read these disclosures and even less likely that they will perform due diligence in investigating whatever facts may be obtained in order to determine the validity of the risk assessment claimed in the prospectus. Rather than creating the kind of transparency that an investor needs in order to make a rational investment decision, the proliferation of formal or merely apparent transparencies—while clearly sufficient to satisfy the disclosure requirements enforced by the SEC—does not produce genuine transparency, let alone accountability. The investors or potential shareholders in the Alibaba Group remain virtually clueless as to how to measure the Group’s financial performance and, therefore, disempowered from exercising any ownership responsibility in and for the firm.

If transparency can be undercut by having too much of it, what are the consequences of having too little of it? The question of defects in transparency is easier to answer than the previous question regarding its excesses. Both extremes can be either deliberate or inadvertent. Too much transparency may provide so much unedited and misinterpreted information—for example, generalizations about risk that look like disclosures—that things can be hidden in plain sight. The intent to deceive may have been operative in them, or deception may have been only an unintended consequence. Or they may have been so skillfully presented in order to create the illusion of inadvertence, thus preserving opacity even while faking full disclosure. The negation of transparency through its defects is relatively simpler to understand than the complexities arising in cases of excessive transparency.

One recent example of the deception made possible by defective forms

of transparency is the role played by Goldman Sachs in the Greek debt crisis.<sup>18</sup> As a member of the European Union, the Greek government had promised to reform its finances, by meeting the targets set by the Stability and Growth Pact of 1996. But having failed to impose the necessary changes to reduce its deficit, the Greek government was under pressure from the EU to reduce its exorbitant interest costs and inordinately high debt ratio, while also moving toward greater transparency in its financial operations. But instead of tackling the problems head-on, the Greek government enlisted the aid of Goldman Sachs, JPMorgan Chase, and other banks, who advised them on how to mask the loans it was accepting as cross-currency swaps, which would allow the loans to be accounted falsely and thus not trigger suspicion that it had failed to comply with the EU directives. The cross-currency swaps masked the fact that Greek indebtedness had only increased, thus indicating that it had defaulted on the promises made at the time of its admission to the Eurozone. It is reported that Goldman earned a fee of \$300 million for its role in facilitating the swaps and then proceeded to short (bet against) the credit risk of the Greek government in dealings with other banks in Germany.<sup>19</sup>

The lack of transparency in Goldman's dealings with the Greek government not only deceived the EU regulators, who were blindsided by the extent of Greece's indebtedness once the global financial crisis got underway. It also provided cover for the kind of double-dealing that Goldman attempted by taking positions against the structured financial schemes that it had arranged for the Greek government.

Undoubtedly, without the assistance of major Wall Street banks like Goldman and JPMorgan Chase, Greece could not have postponed the day of reckoning that would have to come once the consequences of its unwillingness or inability to achieve fiscal reform were evident.

In the meantime, as Greece lay prostrate before its neighbors in the European Union, desperately trying to find a workable solution short of withdrawal from the Eurozone, Wall Street pocketed the hefty fees that it earned by helping to create such mischief. One sobering lesson from the lack of transparency evident in these incidents is that Wall Street bankers apparently will do everything they can to undermine whatever transparency regulatory reformers might attempt to impose. The lack of transparency, in their case, is not a reflection of deeply ingrained cultural values—which may partially explain some of Alibaba's difficulties—but rather an exigency precipitated by the gargantuan conflicts of interest that many Wall Street bankers so boldly



embrace in their relentless pursuit of profit-maximization. Is it any wonder that much of the rest of the world, in its disgust over Wall Street's breathtakingly irresponsible practices, are looking to other financial centers—China, the Middle East, and the other emerging economies among the BRICS nations—for alternatives, institutions that might at least restore some sense of trust and confidence in international finance?

## **STRUGGLING TOWARD TRANSPARENCY IN CHINA AND EAST ASIA**

In our quest for alternatives to post-Enlightenment transparency with its checkered history of too much or too little, we may learn something from changing business practices in China and East Asia. A major trend is the struggle overcontinued reliance on “*guanxixue*”,<sup>20</sup> that is, the cultivation of “*guanxi*” networks to expand the circle of trust beyond one's own immediate family. Traditional “*guanxi*” networks rely on trust based on kinship and other commonalities (for example, being high school classmates, coming from the same rural village, serving in the PLA together), where transparency, as such, is usually neither expected nor demanded. If one has good “*guanxi*”, one tends to be trusted implicitly with virtually no supervision or monitoring of performance. Those who have lived and worked in China and East Asia will confirm that reliance upon “*guanxixue*” is inherently risky. Close family members, as well as people with other ties, have been known to rip each other off, even to the point of destroying their common enterprise in order to get ahead. The question is whether the risks involved in *guanxixue* are any greater or less than the risks that still occur when the European Enlightenment's model of transparency is the norm. Does “good” *guanxixue* inevitably involve some accommodation to the need for transparency? Studies such as Dr. Yadong Luo's *Guanxi and Business* suggest that it is possible to combine the cultivation of *guanxi* networks with transparency in order to achieve greater accountability and trust all around. It all depends on how *guanxixue* is practiced, on whether it can provide the support for robust transparency that makes for successful business relationships.<sup>21</sup>

Transparency seems to reduce the risks of relying on *guanxixue*, since it tends to increase accountability or at least supports the assumption that the demand for supervision or monitoring of performance is a normal and routine part of working within an organization or doing business with other

organizations. The demand for accountability, usually implicit in transparency, need not be regarded—as all too often it is in China and East Asia—as an accusation of wrongdoing. Nor does it mean that someone is not trusted. On the contrary, it is an attempt to establish a basis for deepening trust by expanding the circle of accountability and responsibility, to include others not immediately known personally through the *guanxi* network.

One of the keys to Jack Ma's and Alibaba's impressive success has been his demonstrated ability to use the internet for facilitating business transactions among buyers and sellers who have no prior *guanxi*. Here is Jack Ma's own explanation for what he attempted to do:

“Which country is easier to do business, U.S.A. or China? And I think, China, today, if you still think about we should follow the government policy, you know, *guanxi*, forget it. I have said again and again, in the past 12 years, every time I speak of China, if you meet somebody come to you say, I have a strong *guanxi* with that mayor, forget about this guy. The only *guanxi* is the *guanxi* with the customer. If the customer love you, the government would bitterly love you. Trust me. They need the tax. They need the jobs. But if you want to pick the wrong, you know? You're in trouble. So I don't, I don't believe that, because my relationship with the government in the past 12 years as always in love with them, don't marry them. Always. I love them. Every time they come, I tell them the truth. I do everything they tell me. Yeah, okay. Right, let's communicate. But do business, sorry. My friend does business with government, not me. In this way you get respect from them.”<sup>22</sup>

“The only *guanxi* is the *guanxi* with the customer.” That means building relationships of trust through forms of transparency and accountability that are robust and substantive.

In a subsequent interview with Bloomberg Business' Charlie Rose, Jack Ma indicated how Alibaba was able to overcome the inherent limits of *guanxixue*, especially on his ecommerce platform, Taobao, by creating an ingenious escrow system for holding payments—namely, Alipay—until both the vendors and customers were satisfied.<sup>23</sup> People who were otherwise complete strangers could trust the system, because the payment system was transparent and apparently beyond manipulation. Alipay's escrow system created a transparency that could be trusted, thus enabling Alibaba's

ecommerce platform to operate well beyond the limits of any previously existing guanxi network.

## **CONCLUSION: FRIENDLY ADVICE FOR JACK MA AND ALIBABA**

From the perspective of international business ethics, Jack Ma has made a claim to moral leadership and has sought to capitalize on that claim in the rapid expansion of his businesses. He has consistently asked his investors and other stakeholders to trust him, since, it is claimed, under his leadership, the businesses he has founded have adopted best ethical practices even in the absence of immediate pressure from Chinese government regulators. Alibaba has led the way toward economic and social reform, if Jack Ma is to be believed, with or without the support of the government. But if one raises ethical expectations, claiming to be different from others doing business-as-usual, the result of failure to meet those expectations can be very costly.

This essay examining the challenges of transparency has focused on the Alibaba case because that firm has been, and remains, under intense scrutiny both before and after its NYSE IPO. No business emerging from China has achieved Alibaba's success, no entrepreneur from anywhere has made such extraordinary appeals for trust, nor had these appeals taken seriously by investors and other stakeholders, as has Jack Ma. Our review of his efforts has attempted to be fair-minded, seeking neither to praise nor to disparage Jack Ma's achievement, simply in order to create a morality play. His story is complex, and each piece of it deserves to be judged on its own merits. It may well be that he has been more successful in some things than in others, especially when it comes to business ethics. It seems clear, for example, that the scandal involving Taobao's certification of vendors offering fake merchandise may have blindsided him. We give him the benefit of the doubt on that one and eagerly await further news of his efforts to root out corruption in his ecommerce platforms. On the other hand, we also think that he could do better on transparency in corporate governance. Jack Ma seems very credible personally and surely gifted with extraordinarily persuasive communications skills. But the organization that he has founded in the NYSE IPO still seems opaque and open to all manner of abuse. If Alibaba's governance structure were to become as transparent as Alipay's escrow system, the cheering for Jack Ma might be even more heart-felt.

The bottom line in all this is that, while various regulatory agencies

may mandate sound business ethics as, for example, in the NYSE's listing requirements for IPOs, each such stipulation can be circumvented unless the substance and spirit of ethics are honored as well. Transparency can become more apparent than real, unless one is sincerely committed to the basic principles of mutual respect, reciprocity, and inclusiveness, without which the trust necessary to conduct business will quickly evaporate. There will always be a need for moral leadership in business, since markets cannot and do not police themselves. They must be regulated to insure integrity, but it is also up to individual participants to be vigilant. A bad actor, even on a team committed to doing good, will surely undermine everyone's credibility and, with it, the social capital and trust, upon which depend the team's chances for success. Merely formal compliance with regulations will never be enough. If claims to transparency are to be credible, they must be based on a demonstrated willingness to cultivate the moral virtues that sustain it.

## NOTES

<sup>1</sup> The Occupy Central movement of 2011–2012 was distinct from but indirectly related to the Occupy Central movement that occurred in Hong Kong in 2014. While both were dedicated to the cause of advancing social and economic justice for the citizens of Hong Kong, the relatively small encampment of 2011–2012 was focused on addressing alleged misconduct among the big banks in Hong Kong, especially in their dealings with small investors. By contrast, the 2014 Occupy Central is a mass movement focused on the struggle over the policies and procedures that will govern electoral reform, particularly, the requirements to be used to screen candidates for the office of the HKSAR Chief Executive. For a description of the original movement of 2011–2012, see “Occupy Hong Kong activists camp out at HSBC headquarters”. *The Straits Times of Singapore*. (September 12, 2012). (<http://www.straitstimes.com/breaking-news/asia/story/occupy-hong-kong-activists-camp-out-hsbc-headquarters-20120912>).

<sup>2</sup> See, for example, Jack Ma's open letter to prospective investors, when the IPO was announced (Mac, 2014).

<sup>3</sup> See Bloomberg's analysis of Alibaba's IPO and its impact on share prices generally: Wang, Lam, and Bost, 2014. Soon thereafter, Alibaba's share price declined sharply, and its performance since then has mirrored the overall decline in China stocks. See, for example, CNBC's chart of Alibaba price fluctuations in the past year (CNBC, 2016). On the other hand, Alibaba's extraordinary success on Singles' Day in China suggests that Jack Ma's achievement in online marketing remains unshaken.

See the report, “China's Alibaba breaks Singles' Day record as sales surge” (BBC News, 2015). Jack Ma's business practices do not appear to have adversely affected Alibaba's share prices or the Chinese shoppers' trust in his internet platforms.

<sup>4</sup> The accusation is documented in “Alibaba meets with China regulator, controversial

report retracted” (Reuters, 2015).

- <sup>5</sup> For an account of the AAFA’s claims against Taobao even before the Alibaba IPO, see “Alibaba Cheat Sheet” (Jordan, 2014). The discussion of Taobao and Alibaba can be found in the USTR’s “2014 Out-of-Cycle Review of Notorious Markets” (United States Trade Representative, 2015). While observing that Taobao had been removed in 2012 from the Notorious Markets list, the Review also acknowledges that current complaints—especially those raised by China’s own regulatory agencies—about its failure to curb trafficking in counterfeit goods now required the USTR to continue monitoring the situation, in the hope that there would be further evidence of improvement. The AAFA, however, has continued to accuse Taobao and Alibaba of wrong-doing, even in the face of their recent success on Singles’ Day (Butler-Young, 2015).
- <sup>6</sup> Guilford (2014) provides the basis for this explanation of the Alipay spinoff.
- <sup>7</sup> This structure should not be dismissed as an attempt to hoodwink unwary investors. It is, instead, an arrangement meant to allow Chinese companies to get listed on foreign stock exchanges—thus gaining access to foreign capital—while also complying with China’s restrictive regulations on foreign ownership in certain industries. In this arrangement, the VIE, which controls all the licenses enabling the firm to operate in China, is wholly owned by Chinese citizens, while the WFOE is “an offshore holding company in which foreigners can buy shares. The Chinese entity—which is often controlled by the holding company’s top executives—pays fees and royalties to the offshore company based on contracts between the two” (McMahon & Mozur, 2014). While in principle the relationship of the VIE and the WFOE is not illegal in China, it is considered inherently unstable because of the risks of a government crackdown against such schemes. Over and above the regulatory hazard, the arrangement also makes it impossible for foreign investors to exercise conventional ownership rights through a board of directors representing their interests.
- <sup>8</sup> Jack Ma’s appeal for trust unsupported by the usual structures of accountability and transparency is remarkably consistent in all his business activities. Most recently, he has announced plans to purchase the South China Morning Post, Hong Kong’s premier English language newspaper. When critics expressed concern over what the acquisition might mean for the newspaper’s well-earned reputation for editorial independence, Jack Ma’s answer was simply, “Trust us” (South China Morning Post, 2015). Given his stated intention of using the paper to improve China’s image internationally and the complexity of Alibaba’s relationships with PRC government agencies, without whose approval it could hardly survive, let alone flourish, such an appeal seems like a leap of faith, grounded exclusively on Jack Ma’s apparent track record for making money, and lots of it. While such appeals often raise more questions than they answer, they are consistent with Jack Ma’s claim to be a “Confucian entrepreneur”. Confucian moral philosophy values the leader’s personal sincerity and tends to rely upon it as a sufficient basis for sustaining relationships of trust. Formal procedures designed to create transparency tend to be regarded as either redundant or contrary to the spirit of genuine trust.
- <sup>9</sup> See The Wall Street Journal for an account of how Hong Kong lost the Alibaba IPO (Curran, 2014).
- <sup>10</sup> These differences were highlighted in an essay for the International Bar Association (Mulrenan, 2014).

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- <sup>11</sup> See the philosophical analysis of metaphor in Ricoeur, 1978.
- <sup>12</sup> The work of Juergen Habermas, starting with his seminal essay, *Toward a Rational Society* (Habermas, 1971), and especially his *The Structural Transformation of the Public Sphere: An Inquiry into a category of Bourgeois Society* (Habermas, 1962 translation 1989), and *The Theory of Communicative Action. Two Volumes.* (Habermas, 1985), is especially useful for understanding the origins and development of the European Enlightenment's ideal of transparency.
- <sup>13</sup> See the discussion of various proposals for an investor bill of rights in "Investors: Ethics and Finance" (Rothlin and McCann, 2015: 225–248).
- <sup>14</sup> See "The Natural Priority of Moral Virtue," (Rothlin & McCann, 2015: 23–46) for an attempt at a critical synthesis of Confucian and Western traditions on the moral virtues and how they are to be cultivated in business and the professions.
- <sup>15</sup> See "The Contribution of Emmanuel Levinas to Corporate Social Responsibility and Business Ethics in the Post-Modern Era" (Becker, 2013), and "A reciprocal asymmetry? Levinas' ethics reconsidered" (Tatransky, 2008).
- <sup>16</sup> David Brin's *The Transparent Society: Will Technology Force Us To Choose Between Privacy And Freedom?* (Brin, 1999) provides a vivid discussion of the issues involved. See also Michel Foucault's *Discipline and Punish: The Birth of the Prison* (Foucault, 1995), especially his critique of Jeremy Bentham's model of an ideal penitentiary, the Panopticon.
- <sup>17</sup> This issue is discussed in a case study on the UK's NewsCorp's phone hacking scandal, in "The Social Environment: Ethics and Information Technology" (Rothlin & McCann, 2015: 341–364).
- <sup>18</sup> Myers and Hassanzadeh (2013) demonstrate the pattern, by linking what happened in Greece to the way Enron's indebtedness was hidden by its bankers, notably JPMorgan Chase, in order to sustain its share price and general perception of its success.
- <sup>19</sup> See The New York Times' "Wall St. Helped to Mask Debt Fueling Europe's Crisis." (Story, Thomas, & Schwartz, 2010).
- <sup>20</sup> Yadong Luo's *Guanxi and Business* (Luo, 2000) is particularly helpful in distinguishing guanxixue from corruption. See also numerous studies distinguishing "good" and "bad" forms of guanxixue (Nolan, 2011; Verhezen, 2012).
- <sup>21</sup> For a case study documenting how guanxixue, not properly understood or practiced consistently, can cause the failure of otherwise promising joint ventures in China, see the case study, "Pepsi Sichuan: 'A Marriage too Good to be True?'" (Rothlin & McCann, 2015: 65–75).
- <sup>22</sup> Jack Ma's remarks are recorded in a transcript, "Alibaba's Jack Ma Reflects On 12-Year Journey at China 2.0 Conference", the closing keynote address at the conference "China 2.0: Transforming Media and Commerce", hosted by the Stanford Program on Regions of Innovation and Entrepreneurship (SPRIE) at the Stanford Graduate School of Business, on Sept. 30, 2011 (The Singu Post., 2014).
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- <sup>23</sup> In an extended interview with Bloomberg Business' Charlie Rose, Jack Ma described the challenge of creating a new form of trust beyond the traditional face-to-face of guanxi interactions:

**Jack Ma:** "When you start doing business via the internet, I don't know you and you don't know me. How can you do things online unless you have trust? For ecommerce, the most important thing was trust. When I first went to the U.S.A. to raise money (talk to the venture capitalists), many people said 'Jack, China does business via guanxi. How can you do business via the Internet?' I know that without the trust system, the credit system is impossible to do business. In the past 14 years, everything we do is about trying to build up the trust system. Charlie, I'm so proud today. Today, in China and in the world, people don't trust each other. The Government, people, media, and everybody think 'this guy is cheating'. Because of ecommerce, we finish 60 million transactions daily. People don't know each other. I don't know you. I send products to you. You don't know me. You wire the money to me. I don't know you. I give a package to a person. I don't know him. He took something across the ocean — across the river. This is the trust. We have at least, 60 million trusts happening every day."

**Charlie Rose:** "You created it by creating an escrow account in the beginning and so, you keep the money until they got the product. Then you release the money."

**Jack Ma:** "That's true. The escrow service is about how we pay. For the three years, Alibaba was just an e-marketplace for information. What do you have? What do I have? We talk for a long time, but don't do any business, because there is no payment. I talked to the banks. No banks wanted to do it. Banks said 'oh no, this thing would never work' so I didn't know what to do. If I start to launch a payment system, it's against the financial legal laws because you need to have a license. If I don't do it, ecommerce will go nowhere. Then, I went to Davos. I listened to a leadership discussion. Leadership is about responsibility. After I listened to that panel, I made a call to my friends/colleagues and said 'do it now — immediately'. If something's wrong and the Governor's unhappy about that; if one body has to go to the prison, Jack might go. It is so important for China and the world to be able to trust the system" (BizNews.com, 2015).

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# The Quality of a USB-based Learning Management System

**Dave E. Marcial**

*College of Computer Studies*

*Silliman University*

This paper empirically evaluates the quality of the developed USB-based learning management system, called PLMS. The PLMS is a handy learning management system that can run on USB flash drives. It organizes classroom information and learning activities even without internet connectivity. Specifically, this article presents the levels of functionality, reliability, usability, efficiency, portability, and pedagogical characteristics of the portable learning management system. Likewise, this article also describes the relationship between the respondent's profiles and quality level. Respondents of the study are teacher educators in higher education institutions in the five provinces in the Visayas Region, Philippines. The study utilized ISO 9126 Software Quality Model as the basis of the survey questionnaire. Results show that all quality statements—functionality ( $\bar{x} = 3.62$ ), reliability ( $\bar{x} = 3.46$ ), usability ( $\bar{x} = 3.39$ ), efficiency ( $\bar{x} = 3.49$ ), portability ( $\bar{x} = 3.71$ ), and pedagogical characteristic ( $\bar{x} = 3.61$ )—are rated with a description 'strongly agree' with an overall mean of 3.56. The result also shows that age and number of years in teaching are significantly related to the quality of PLMS. The results also indicate that none of the technologic variables is having a significant relationship with any of the six quality components. The study concludes that PLMS is a fully-operational portable learning management system. It recommends the maximum utilization of PLMS in higher education institutions.

**Keywords:** Learning Management System, Mobile Learning, Portable Learning Management System, Software Quality Testing

## INTRODUCTION

Quality refers to the degree of excellence and a characteristic or feature that something has (Merriam-Webster). In software engineering, “quality is the properties of compliance and modifiability, qualification of either leading to concomitant reservation on software quality” (Macro, 1990). In software design, quality is associated with measurement (Budgen, 2003). According to Pressman (2001), software measurements have two categories. These categories include the direct measures and indirect measures. Accordingly, direct measures include cost and effort applied to the product like lines code produced, execution speed, memory size, and defects reported over some set period. On the other hand, indirect measures include functionality, quality, complexity, efficiency, reliability, and maintainability. “Software quality is the conformance to explicitly stated functional and performance requirements, explicitly documented development standards, and implicit characteristics that are expected of all professionally developed software” (Pressman, 2001). A software quality plan should explicitly identify the quality attributes that are most significant to a particular project and should set out how these attributes can be assessed (Sommerville, 1997). Thus, software testing plays a critical role in the implementation phase of the software development life cycle.

Software testing is an analysis performed to provide stakeholders with information about the quality of the software (Kaner, 2006). It is a critical component of software quality assurance and characterizes the final appraisal of the specification, design, and code generation (Pfleeger, 2002). There are several approaches that software engineering books mentioned. Sommerville (1997) said that diverse types of testing used different forms of test data. These test data include statistical testing and defect testing. Macro (1990) summarized six categories of testing practices. These are author, adversary, static, dynamic, top-down, and bottom-up. He said that the basic methods of enhancing confidence in software quality are conducting quality control and inspection and performing quality assurance and the role of black-box and white-box testing. Moreover, most of the said books specified two particular steps: these are black-box testing and the white-box testing. In large-scale systems development, testing involves several stages (Pfleeger, 2002). This testing includes module testing, component testing, and unit testing. Pressman (2001) and Budgen (2003) suggest conducting formal technical reviews as a mean to ensure software quality. According to Sommerville (1997) and

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Pressman (2001), statistical testing can be used to test the system's performance and reliability.

With the aim to provide innovative teaching in higher education institutions in the Philippines, a portable learning management system was developed. The system is called PLMS, a handy learning management system that can run on USB flash drives. The PLMS organizes classroom information and learning activities, even without internet connectivity. It is a kind of information system that is transferable to multiple environments and manageable to a variety of infrastructure specifications using a USB flash drive. The PLMS was designed using pedagogical principles embedded in Moodle to help teachers develop innovative teaching and learning practices even being challenged with internet connectivity.

This paper aimed to measure the quality level of PLMS statistically as perceived by teacher educators in higher education institutions in the Philippines. It is part of a larger research entitled "ICT in Teacher Education in Region 7, Philippines". Specifically, this article presents the levels of functionality, reliability, usability, efficiency, portability, and pedagogical characteristics of the portable learning management system. Likewise, this article also describes the association between the quality levels and the profiles of the respondents.

## **RELATED LITERATURE**

Among the longstanding popular models of software quality includes Boehm's model, McCall's model, Dromey's model, and ISO 9126 (Pfleeger, 2002). Boehm's model listed seven quality factors, namely: portability, reliability, efficiency, usability, testability, understandability, and flexibility (see Figure 1). "Boehm's model asserts that quality software is software that satisfies the needs of the users and programmers involved with it" (Pfleeger, 2002). On the other hand, McCall's model identified 11 quality factors. These are maintainability, flexibility, testability, portability, reusability, interoperability, correctness, reliability, efficiency, integrity, and usability (see Figure 2). These factors, according to McCall and Cavano (1979), as cited in Pressman (2001), assess software from three distinct points of view: product operation, product revision, and product transition. For Dromey, "product quality is largely determined by the choice of components that comprise the product, the tangible properties of components, and the tangible properties of component

composition” (Pfleeger, 2002). Dromey’s quality model uses four properties. These are correctness, internal, contextual, and descriptive (see Figure 3). Last but not the least is the ISO 9126 (see Figure 4). The ISO 9126 is a worldwide software quality standard. Table 1 shows the six major attributes of the hierarchical model contributing to quality (ISO, 1991, cited in Pfleeger, 2002).

**Table 1.** ISO 9126 Quality Characteristics (Pfleeger, 2002, p. 525).

| Quality Characteristic | Definition   |
|------------------------|--|
| Functionality          | This is a set of attributes that bear on the existence of a set of functions and its their specified properties. The functions are those that satisfy stated or implied needs.   |
| Reliability            | This is a set of attributes that bear on the capability of software to maintain its performance level under stated conditions for a stated period.   |
| Usability              | This is a set of attributes that bear on the effort needed for use and on the individual assessment of such use by a stated or implied set of users.   |
| Efficiency             | This is a set of attributes that bear on the relationship between the software’s performance and some resources used under stated conditions.  |
| Maintainability        | This is a set of attributes that bear on the effort needed to make specified modifications (which may include corrections, improvements, or adaptations of software to environmental changes and the changes in the requirements and functional specifications). |
| Portability            | This is a set of attributes that bear on the ability of software to be transferred from one environment to another (including the organizational, hardware, or software environment).  |

According to Pfleeger (2002), one major difference between the ISO model and those of McGall and Boehm is that the ISO hierarchy is strict. Pfleeger (2002) means that “the right-hand characteristics are related to the user view of the software, rather than to an internal, developer view”. It is in this context that this study employed ISO 9126. The ISO 9192 has three extensions, and these include ISO/IEC 9126-1: Quality characteristics and subcharacteristics; ISO/IEC 9126-2: External metrics; and ISO/IEC 9126-3: Internal metrics (Veenendaal & McMullan, 2003). It is a surprise that the factors that defined software quality in the 1970s are the same factors that continue to define software quality in the first decade of this century (Pressman, 2001).

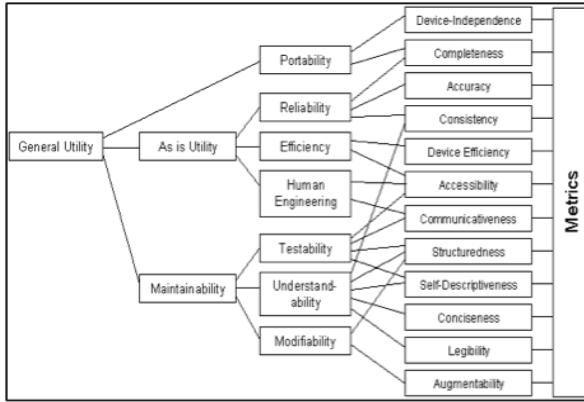


Figure 1. Boehm's model, Quality Model (www.sce2.umkc.edu)

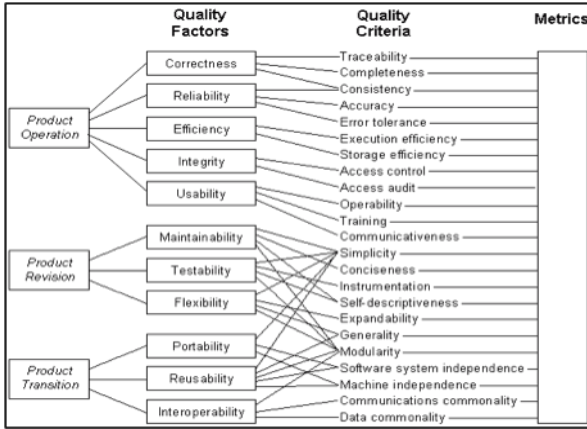


Figure 2. McCall's Quality Model (www.sce2.umkc.edu)

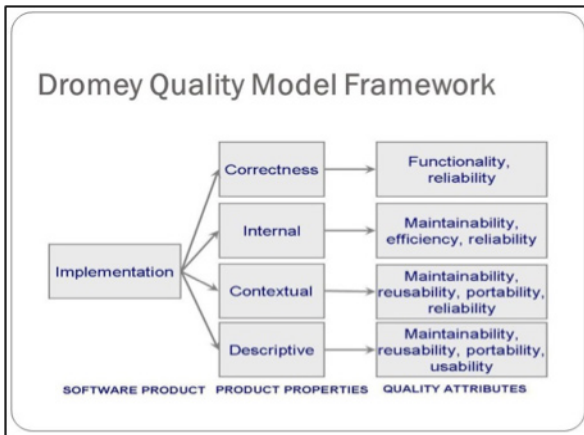
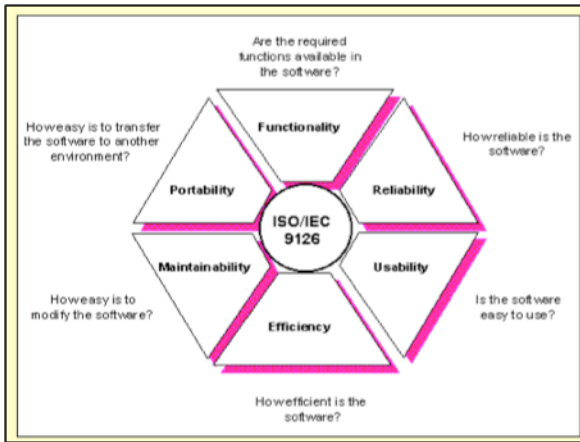


Figure 3. Dromey's Model (www.slideplayer.com)





**Figure 4.** ISO/IEC 9126: The six quality characteristics of a software (<http://www.cse.dcu.ie/essiscope/sm2/9126ref.html>)

Studies have shown that ISO 9126 is the best quality model for e-learning-related systems like learning management systems. Chua and Dyson (2004) validated that ISO 9126 was a useful tool for evaluating learning management systems. They asserted that the said quality model was helpful in detecting design flaws and faults. The study of Djouab and Bari (2016) proposed a unique quality characteristic of evaluating e-learning software products. The ISO 9126 standard was the basis of their assessment. On the other hand, Fahmy, Haslinda, Roslina, and Fariha (2012) proposed an empirical method for identifying characteristics of software quality of e-book materials based on ISO 9126. Further, Titthasiri (2014) asserted that ISO 9126 model proposed the idea of ‘error prevention,’ instead of ‘error correction.’ The author argued that “ISO 9126 model is used to be a standard specification for having a software engine with high quality before implementation.”

Numerous factors influence the quality and several techniques for assessing it. Pressman (2001) emphasized that software requirements are the foundation for measuring quality. Lack of conformance to requirements is a lack of quality. Second, specified standards define a set of development criteria that guide the manner in which software is engineered. If the criteria are not followed, lack of quality will almost surely result. Lastly, a set of implicit requirements often goes unmentioned. If software conforms to its explicit requirements but fails to meet implicit requirements, software quality is suspect. Likewise, Sommerville (1997) identified four principal factors that affect quality. These were process quality, development technology, people quality, and cost, time,

and schedule. He also argued that quality was likely high if the development team has a great ability and experience. “The quality of a system is only as good as the requirements that describe the problem, the design that models the solution, the code that leads to an executable program, and the tests that exercise the software to uncover errors” (Pressman, 2001).

## **METHOD**

### **Research Design**

The study implemented a descriptive–correlative and utilized a survey method. It described the quality level of PLMS. Likewise, this study employed a correlation of two variables specifically the demographic and technological profiles and the usability level.

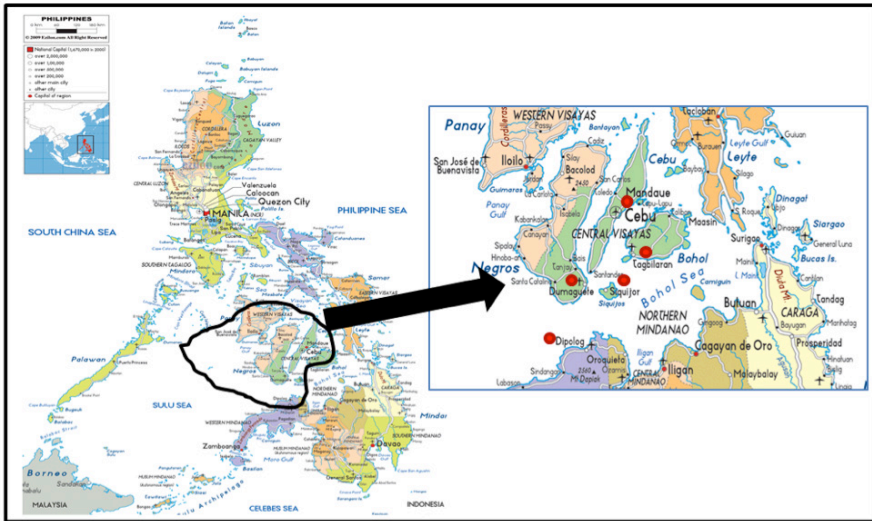
### **Research Environment**

The study was conducted in higher education institutions (HEIs) offering any teacher education programs in the four provinces of Central Visayas, Philippines. Likewise, the study was also undertaken in Dipolog City, Province of Zamboanga del Norte. See Figure 1 for the map of the Philippines illustrating the study sites. The teacher education program refers to recognized degree programs such as Bachelor of Science in Secondary Education and Bachelor of Science in Elementary Education offered in public and private HEIs. The HEIs include private, public, and community colleges and universities in Bohol, Cebu, Negros Oriental, and Siquijor.

### **Respondents**

The respondents of the study were trainees of the regionwide user training on the use and classroom integration of PLMS. These trainees were full-time faculty teaching any professional or specialization courses of the teacher education program. Also, a few student-teachers joined the training. Selection of trainee-participants depended on the participating HEIs. The HEIs involved during Year 1 of the project received the training invitation. The trainee’s willingness to use and integrate PLMS into their classroom instruction was the only explicit qualification to participate during the end-user training. There

were 152 participants in all five batches of training. A total enumeration of respondents was employed. Of the 152, 123 participants participated in the survey, and the analysis included responses from 116 participants.



**Figure 5.** Map of the Philippines illustrating the study sites  
(Map is downloaded from <http://www.ezilon.com/maps/asia/philippines-maps.html>)

## Instrument

The instrument used in data gathering to undertake the usability of PLMS was a survey questionnaire. The statements in the survey were based on the ISO 9126. These statements were categorized into six quality factors in the ISO Software Quality Model. These were functionality, reliability, usability, efficiency, portability, and the pedagogical characteristic of PLMS. Each factor was composed of at least three specific statements. Respondents were asked to rate their level of agreement with the quality statements according to four-point scale choices: 4 — strongly agree; 3 — agree; 2 — disagree; and 1 — strongly disagree. Further, the survey questionnaire also included the demographic and technologic profile of the five batches of trainees. These profiles were used in measuring relationships with the usability components.

## Data Collection

There were five different settings during the data collection. The collection was during the end-user training batches of PLMS. The training was face-to-face,

and it aimed to demonstrate, practice, and do hands-on activities with the use and classroom integration of the newly developed PLMS. The three batches of training are provincial-based where it was attended by participants from many institutions. On the other hand, the last two batches were school-based where participants are coming only from the host institution. The first group of the end-user training was composed of HEIs in Negros Oriental and Siquijor. It was held on October 26–27, 2015 at Silliman University, Dumaguete City, Negros Oriental. The second batch of training was attended by HEIs in Cebu province. It was held on October 28–29, 2015 at the University of Cebu — Main Campus, Cebu City. The third batch was attended by HEIs in Bohol province. It was held on October 30–31, 2015 at Holy Name University, Tagbilaran City. The fourth batch of training was participated by teachers and student-teachers in Bohol Island State University — Calape Campus, a satellite campus of a state university in the Province of Bohol. The training was held on November 12–13, 2015. The last batch of end-user training was participated by teachers in Dipolog Medical Center College Foundation, a private school in Dipolog City, Zamboanga de Norte. The training was held on December 8–9, 2015. The survey questionnaire was distributed to all participants during the last hour of the training. Respondents were given the option to either respond to the survey using the printed copy or online through Google Form.

In total, 116 responses were included in the analysis. Filled-out questionnaires from unqualified respondents were deleted. Particularly, responses from participants who did not come from HEIs were removed. Double entries were also checked in the case of online responses. In this case, seven responses were rejected because these responses were from respondents who did not come from HEIs.

## **Data Analysis**

The statistical tools employed in the data processing were frequency and percentage for the demographic profile as well as the technology ownership profile of the respondents. Also, the weighted mean was used for measuring the quality level. The chi-square was used to determine if there are significant relationships that exist between the quality level and sex, status, and technology ownerships among the respondents. The Spearman's Rank-Order Correlation computation was used to determine if there were significant relationships that existed between the quality level and age, highest educational attainment,

and number of years of teaching among the respondents. Lastly, the ANOVA analysis was used in determining whether or not the quality level across the five batches significantly differed.

## RESULTS

### Demographic Profile of the Respondents

As shown in Table 2, 43 (37.07%) were male, and 73 (62.93%) were females. There were 89 (76.72%) aged 18–40 and 25 (21.55%) aged 41–65. No one was over 65 years old, and two (1.73%) opted not to answer. More than a majority of the respondents were teaching for less than eight years. A little higher than the majority were single respondents (69, 59.48%). Regarding the respondents' highest educational attainment, 43 (37.07%) had a master's degree, 42 (36.21%) had a bachelor's degree, 22 (18.97%) were undergraduates who were student-teachers, and 9 (7.76%) had doctorate degrees. As for batches of training, there were 31 (26.70%) participants in the first batch, 16 (13.80%) in the second batch, 29 (25%) in the third batch, 21 (18.1%) in the fourth batch, and another 19 (16.4%) in the fifth batch. There were more (67, 63.81%) respondents coming from the private HEI than the public.

**Table 2.** Demographic Profile of the Respondents.

| PROFILE                            | Total |        |
|------------------------------------|-------|--------|
|                                    | f     | %      |
| <b>Sex</b>                         |       |        |
| Male                               | 43    | 37.07  |
| Female                             | 73    | 62.93  |
| Total                              | 116   | 100.00 |
| <b>Age</b>                         |       |        |
| 18-- 40                            | 89    | 76.72  |
| 41 - 65                            | 25    | 21.55  |
| > 65                               | 0     | 0.00   |
| No Answer                          | 2     | 1.73   |
| Total                              | 116   | 100.00 |
| <b>Number of Years In Teaching</b> |       |        |
| 0--7                               | 72    | 62.07  |
| 8--14                              | 12    | 10.35  |

|                                       |     |        |
|---------------------------------------|-----|--------|
| 15--21                                | 11  | 9.48   |
| 22--28                                | 4   | 3.45   |
| 29--35                                | 0   | 0.00   |
| 36--43                                | 1   | 0.86   |
| No Answer                             | 16  | 13.79  |
| Total                                 | 116 | 100.00 |
| Status                                |     |        |
| Single                                | 69  | 59.48  |
| Married                               | 46  | 39.66  |
| Others                                | 1   | 0.86   |
| Total                                 | 116 | 100.00 |
| <b>Highest Educational Attainment</b> |     |        |
| Undergraduate                         | 22  | 18.97  |
| Bachelor's Degree                     | 42  | 36.21  |
| Master's Degree                       | 43  | 37.07  |
| Doctoral/PhD                          | 9   | 7.76   |
| Total                                 | 116 | 100.00 |
| Type of HEI                           |     |        |
| Public                                | 33  | 36.19  |
| Private                               | 67  | 63.81  |
| Total                                 | 116 | 100.00 |
| <b>Batches of Training</b>            |     |        |
| First Batch                           | 31  | 26.70  |
| Second Batch                          | 16  | 13.80  |
| Third Batch                           | 29  | 25.00  |
| Fourth Batch                          | 21  | 18.10  |
| Fifth                                 | 19  | 16.40  |
| Total                                 | 116 | 100.00 |

### Technologic Profile of the Respondents in Central Visayas

Table 3 shows the technological ownership of the respondents presented according to batches of trainees. The data only presents the ownership of the respondents in the Central Visayas region. Of the 70 respondents, more than half (46, 64.71%) did not have an Android-based tablet. Likewise, 63 (90%) respondents said that they did not have an iPad tablet computer. Surprisingly, no one in Bohol had an iPad computer. On the contrary, more than the majority (61, 87.14%) owned a laptop computer, but a little more than half of

the respondents (41, 58.67%) had no desktop computers. The data shows that there were more respondents from Negros Oriental and Siquijor (15, 62.50%) who possessed a desktop computer than those from Cebu (7, 25%) and Bohol (7, 38.89%). The results also show that about 75% of the respondents had Smartphones.

**Table 3.** Technologic Ownership of the Respondents  
by Training Batch in Central Visayas.

| Profile                 | Batch of Trainees          |        |      |        |       |        | Total |        |
|-------------------------|----------------------------|--------|------|--------|-------|--------|-------|--------|
|                         | Negros Oriental & Siquijor |        | Cebu |        | Bohol |        |       |        |
|                         | f                          | %      | f    | %      | f     | %      | f     | %      |
| <b>Android Tablet</b>   |                            |        |      |        |       |        |       |        |
| Yes                     | 8                          | 33.33  | 7    | 25.00  | 9     | 50.00  | 24    | 34.29  |
| No                      | 16                         | 66.67  | 21   | 75.00  | 9     | 50.00  | 46    | 64.71  |
| Total                   | 24                         | 100.00 | 28   | 100.00 | 18    | 100.00 | 70    | 100.00 |
| <b>iPad Computer</b>    |                            |        |      |        |       |        |       |        |
| Yes                     | 5                          | 20.83  | 2    | 7.14   | 0     | 0.00   | 7     | 10.00  |
| No                      | 19                         | 79.17  | 26   | 92.86  | 18    | 100.00 | 63    | 90.00  |
| Total                   | 24                         | 100.00 | 28   | 100.00 | 18    | 100.00 | 70    | 100.00 |
| <b>Laptop Computer</b>  |                            |        |      |        |       |        |       |        |
| Yes                     | 23                         | 95.83  | 23   | 82.14  | 15    | 83.33  | 61    | 87.14  |
| No                      | 1                          | 4.17   | 5    | 17.86  | 3     | 16.67  | 9     | 12.86  |
| Total                   | 24                         | 100.00 | 28   | 100.00 | 18    | 100.00 | 70    | 100.00 |
| <b>Desktop Computer</b> |                            |        |      |        |       |        |       |        |
| Yes                     | 15                         | 62.50  | 7    | 25.00  | 7     | 38.89  | 29    | 41.43  |
| No                      | 9                          | 37.50  | 21   | 75.00  | 11    | 61.11  | 41    | 58.67  |
| Total                   | 24                         | 100.00 | 28   | 100.00 | 18    | 100.00 | 70    | 100.00 |
| <b>Smartphone</b>       |                            |        |      |        |       |        |       |        |
| Yes                     | 18                         | 75.00  | 20   | 71.43  | 14    | 77.78  | 52    | 74.29  |
| No                      | 6                          | 25.00  | 8    | 28.57  | 4     | 22.22  | 18    | 25.71  |
| Total                   | 24                         | 100.00 | 28   | 100.00 | 18    | 100.00 | 70    | 100.00 |

## Quality Level

Table 4 shows the quality level of PLMS. In terms of quality level, the table reveals a means of 3.56, which corresponds to 'strongly agree'. Unexpectedly, all quality components—functionality ( $\bar{x}$ = 3.62), reliability ( $\bar{x}$ = 3.46), usability ( $\bar{x}$ =

3.39), efficiency ( $\bar{x} = 3.49$ ), portability ( $\bar{x} = 3.71$ ), and pedagogical characteristic ( $\bar{x} = 3.61$ )—were given a rating that corresponds to ‘strongly agree.’ Specifically, all statements, except one, were described as ‘strongly agree.’ The table shows that the portability component was rated highest in terms of the overall mean value, followed by the functionality component level. The highest overall mean was equal to 3.78 belonging to the functionality component which was “PLMS performs the assigned tasks.” On the contrary, the statement “PLMS is operated with minimal effort” got the lowest mean level of 3.27, described as ‘agree.’

**Table 4.** Quality Level

| Functionality Statements      |   | Total |                |
|-------------------------------|---|-------|----------------|
|                               |   | Mean  | Description    |
| 1.                            | PLMS performs the assigned tasks.                         | 3.78  | Strongly Agree |
| 2.                            | PLMS produces the expected results.                       | 3.73  | Strongly Agree |
| 3.                            | PLMS interacts with another computer system.              | 3.47  | Strongly Agree |
| 4.                            | PLMS is equipped with the acceptable security measure.    | 3.51  | Strongly Agree |
| <b>Overall Mean</b>           |   | 3.62  | Strongly Agree |
| <b>Reliability Statements</b> |   |       |                |
| 5.                            | PLMS responds to my teaching requirements.                | 3.64  | Strongly Agree |
| 6.                            | Most of the faults in PLMS can be eliminated over time.   | 3.41  | Strongly Agree |
| 7.                            | PLMS can handle errors.                                   | 3.38  | Strongly Agree |
| 8.                            | PLMS can resume working and restore data after a failure. | 3.39  | Strongly Agree |
| 9.                            | PLMS complies with my reliability requirements.           | 3.48  | Strongly Agree |
| <b>Overall Mean</b>           |   | 3.46  | Strongly Agree |
| <b>Usability Statements</b>   |   |       |                |
| 10.                           | PLMS is easy to understand.                               | 3.40  | Strongly Agree |
| 11.                           | PLMS is easy to learn.                                    | 3.46  | Strongly Agree |
| 12.                           | PLMS is operated with minimal effort.                     | 3.27  | Agree          |
| 13.                           | The interface of PLMS is appealing.                       | 3.36  | Strongly Agree |
| 14.                           | PLMS complies with my usability requirements.             | 3.48  | Strongly Agree |



|   |   |                      |      |                |
|---|---|----------------------|------|----------------|
|   |   | <b>Overall Mean</b>  | 3.39 | Strongly Agree |
| <b>Efficiency Statements</b>                |   |                      |      |                |
| 15.   | PLMS behaves promptly.                                      |                      | 3.42 | Strongly Agree |
| 16.   | PLMS complies with my efficiency requirements.              |                      | 3.45 | Strongly Agree |
| 17.   | PLMS utilizes resources efficiently.                        |                      | 3.56 | Strongly Agree |
|   |   | <b>Overall Mean</b>  | 3.49 | Strongly Agree |
| <b>Portability Statements</b>               |   |                      |      |                |
| 18.   | PLMS can be moved to another computer environment.          |                      | 3.71 | Strongly Agree |
| 19.   | PLMS is easy to install.                                    |                      | 3.73 | Strongly Agree |
| 20.   | PLMS complies with my portability requirement.              |                      | 3.71 | Strongly Agree |
|   |   | <b>Overall Mean</b>  | 3.71 | Strongly Agree |
| <b>Pedagogical Characteristic Statement</b> |   |                      |      |                |
| 21.   | PLMS complies with a pedagogical approach in the classroom. |                      | 3.61 | Strongly Agree |
|   |   | <b>Mean of Means</b> | 3.56 | Strongly Agree |

The lowest mean (strongly agree) of the functionality statements is on the interaction of PLMS with another computer system. The statement about compliance with teaching requirements has the highest weighted mean of 3.64 in terms of the reliability component, while the lowest mean is on error-handling. The highest mean level in the usability component is in the statement “PLMS complies with usability requirement” with an average of 3.48. Regarding the efficiency level, the highest mean (3.56) is the statement “PLMS utilizes resources efficiently.” The highest mean under portability is on the statement about easy installation of PLMS ( $\bar{x}= 3.73$ ).

### Test of Relationship between the Profiles and Usability

Tables 5 and 6 show the results of the analysis done so as to establish whether or not a significant association existed between the respondents’ profile and their agreement level of the quality of PLMS. As shown in Table 5, age and number of years in teaching are significantly related to the quality of PLMS. Specifically, the table shows that age has a significant relationship with reliability ( $r_s = 0.2566$ ,  $p < 0.01$ ), usability ( $r_s = 0.2872$ ,  $p < 0.01$ ), and efficiency ( $r_s = 0.3795$ ,  $p < 0.01$ ). Shown also in Table 5 is the number of years in teaching,

which has significant correlations with functionality ( $r_s = 0.2327, p < 0.05$ ), reliability ( $r_s = 0.2571, p < 0.01$ ), usability ( $r_s = 0.2407, p < 0.05$ ), and efficiency ( $r_s = 0.3808, p < 0.01$ ). There was a nonsignificant correlation of 0.1721 ( $p = n.s$ ), 0.1508 ( $p = n.s$ ), and 0.1221 ( $p = n.s$ ) between age and functionality, between age and portability, and between age and pedagogical characteristic of PLMS, respectively. In the same way, there is a nonsignificant correlation of 0.1953 ( $p = n.s$ ) between number of years of teaching and portability as well as of 0.1503 ( $p = n.s$ ) between number of years of teaching and pedagogical characteristic of PLMS.

**Table 5.** Test of relationship between Age and No. of Years of Teaching and usability.

| Variables                           | $r_s$ value | p - Value | Df  | Remarks         |
|-------------------------------------|-------------|-----------|-----|-----------------|
| Age and                             |             |           |     |                 |
| Functionality                       | 0.1721      | 0.0684    | 111 | Not Significant |
| Reliability                         | 0.2566      | 0.0060    | 111 | Significant     |
| Usability                           | 0.2872      | 0.0020    | 111 | Significant     |
| Efficiency                          | 0.3795      | 0.0001    | 111 | Significant     |
| Portability                         | 0.1508      | 0.1102    | 111 | Not Significant |
| Pedagogical                         | 0.1221      | 0.1963    | 111 | Not Significant |
| <b>No. of Years in Teaching and</b> |             |           |     |                 |
| Functionality                       | 0.2327      | 0.0197    | 98  | Significant     |
| Reliability                         | 0.2571      | 0.0099    | 98  | Significant     |
| Usability                           | 0.2407      | 0.0161    | 98  | Significant     |
| Efficiency                          | 0.3808      | 0.0001    | 98  | Significant     |
| Portability                         | 0.1953      | 0.0529    | 97  | Not Significant |
| Pedagogical                         | 0.1503      | 0.1368    | 98  | Not Significant |

Table 6 shows that only the variable, highest educational attainment, has a significant association with the quality level of PLMS. Specifically, the study indicates that there is an evidence of a significant relationship between highest educational attainment and usability of PLMS ( $\chi^2 (1, N = 116) = 7.760, p < 0.05$ ). Likewise, highest educational attainment is significantly related with efficiency level ( $\chi^2 (1, N = 116) = 4.520, p < 0.05$ ).

**Table 6.** Test of Relationship between Sex, Status, Highest Educational Attainment, and Type of Institution and Usability.

| Variables                                 | $\chi^2$ | $p$ - Value | Df | Remarks         |
|---|----------|-------------|----|-----------------|
| <b>Sex and</b>                            |          |             |    |                 |
| Functionality                             | 0.850    | 0.357       | 1  | Not Significant |
| Reliability                               | 0.660    | 0.4166      | 1  | Not Significant |
| Usability                                 | 0.050    | 0.8231      | 1  | Not Significant |
| Efficiency                                | 3.040    | 0.081       | 1  | Not Significant |
| Portability                               | 2.260    | 0.1328      | 1  | Not Significant |
| Pedagogical                               | 0.210    | 0.6468      | 1  | Not Significant |
| <b>Status and</b>                         |          |             |    |                 |
| Functionality                             | 0.010    | 0.920       | 1  | Not Significant |
| Reliability                               | 2.300    | 0.129       | 1  | Not Significant |
| Usability                                 | 0.430    | 0.512       | 1  | Not Significant |
| Efficiency                                | 3.230    | 0.072       | 1  | Not Significant |
| Portability                               | 0.570    | 0.450       | 1  | Not Significant |
| Pedagogical                               | 0.020    | 0.888       | 1  | Not Significant |
| <b>Highest Educational Attainment and</b> |          |             |    |                 |
| Functionality                             | 0.040    | 0.842       | 1  | Not Significant |
| Reliability                               | 0.07     | 0.791       | 1  | Not Significant |
| Usability                                 | 7.760    | 0.021       | 1  | Significant     |
| Efficiency                                | 4.520    | 0.034       | 1  | Significant     |
| Portability                               | 3.440    | 0.064       | 1  | Not Significant |
| Pedagogical                               | 0.010    | 0.920       | 1  | Not Significant |
| <b>Type of Institution and</b>            |          |             |    |                 |
| Functionality                             | 0.000    | 1.000       | 1  | Not Significant |
| Reliability                               | 0.350    | 0.554       | 1  | Not Significant |
| Usability                                 | 1.23     | 0.267       | 1  | Not Significant |
| Efficiency                                | 0.210    | 0.647       | 1  | Not Significant |
| Portability                               | 0.050    | 0.823       | 1  | Not Significant |
| Pedagogical                               | 1.190    | 0.275       | 1  | Not Significant |

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## **Test of relationship between the Technology Ownerships and Usability**

The results of the chi-square analysis indicate that none of the technologic variables has a significant association with any of the six quality components ( $p > 0.05$ ). The result implies that having mobile technologies like Android tablet, iPad, laptop, desktop computer, and Smartphone does not guarantee the improvement of the quality of PLMS with regard to functionality, reliability, usability, efficiency, portability, and pedagogy.

## **Test of Difference between the Quality Level and Training Batches**

With the six ANOVA analyses, not one came out to be significantly different. There were no statistically significant differences between batch means and functionality level ( $F(4,111) = 1.52, p = 0.201$ ), reliability level ( $F(4,111) = 0.99, p = 0.416$ ), usability level ( $F(4,111) = 0.66, p = 0.621$ ), efficiency level ( $F(4,111) = 0.41, p = 0.801$ ), portability level ( $F(4,110) = 1.33, p = 0.263$ ), and pedagogical characteristic ( $F(4,111) = 1.48, p = 0.213$ ).

## **DISCUSSION**

### **PLMS Functionality**

The PLMS is perceived as a functional teaching tool. The results imply that PLMS can perform any assigned classroom activities quickly. The results mean that PLMS easily produces the expected outcomes, and it interacts with another computer system. Moreover, the results suggest that PLMS is embedded with extremely acceptable security measures to protect the teaching resources and learning activities saved.

### **PLMS Reliability**

The PLMS is deemed a complete, consistent, and robust (Budgen, 2003) learning management platform. The results suggest that PLMS can handle all combinations of classroom events and activities in the system. Likewise, the findings also imply that PLMS is repeatable regardless of the overall system loading. The results mean that most of the faults in PLMS can be

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eliminated over time. The PLMS runs properly for very extended periods of time without failure (Pfleeger, 2002). When errors are encountered, PLMS can resume working and restore classroom data and information. In reference to Boehm's model, PLMS has integrity and consistency characteristics. This means that PLMS complies with the respondent's reliability requirements. Most importantly, the results connote that PLMS responds to the respondent's teaching requirements.

### **PLMS Usability**

Teacher educators evaluated PLMS as having high usability attributes. The results show that PLMS is user-friendly technology. This means that PLMS is easy to understand and learn not just for the digital natives but as well as for the digital immigrants. The interface of PLMS is deemed appealing. The results suggest that teachers have the physical or intellectual skill essential to learn the PLMS (Pressman, 2001). There is minimal time required to become moderately efficient in the use of PLMS. Therefore, PLMS can be operated with minimal effort without any apprehensions and fear.

### **PLMS Efficiency**

The PLMS is efficient as perceived by the teachers. Although the efficiency of a system can be measured through its use of resources such as processor time, memory, network access, system facilities, and disk space (Budgen, 2003), the respondents strongly believe that PLMS behaves promptly and utilizes classroom resources efficiently.

### **PLMS Portability**

The PLMS can be moved from one computer to another without disturbing the functionality of the system (Pfleeger, 2002). This means that PLMS is easy to install. It is portable and handy as perceived by the teachers. The PLMS is self-contained, which means that the installer of PLMS does not require any remote files or utilities (What is a portable app?, 2016).

### **PLMS Pedagogical Characteristic**

The PLMS has the necessary pedagogical characteristic. The results imply

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that PLMS embeds a pedagogical approach that can help achieve innovative teaching. The results suggest that the teachers have a positive attitude towards the full integration of PLMS into their teaching job.

### **Relationships and Differences of the Variables**

The test of the relationship between age and quality signifies that a teacher's age affects the quality of PLMS. Specifically, the results show that age has something to do with quality aspects of reliability, usability, and efficiency but not with functionality, portability, and pedagogical characteristic. Xenos and Christodoulakis (1995) posits that the "user's age has to do with his ability to adopt new technologies." Likewise, number of years of teaching is also a factor in the quality of PLMS particularly in the aspect of functionality, reliability, usability, and efficiency. The results also mean that teaching experience does not affect the quality of PLMS regarding portability and pedagogical characteristic. Further, highest educational attainment is found to be a factor in the quality of PLMS specifically on the aspects of usability and efficiency but not with functionality, reliability, portability and pedagogical characteristic. The data revealed that teachers with master's degree were better in learning and understanding PLMS easily. The data also disclosed that teachers with a doctorate degree had a better ability to perform PLMS well than those with other educational attainments. This result is explained by Xenos and Christodoulakis (1995) who said that a user's education helps in expressing serious critique in software quality. On the contrary, sex, civil status, and type of institution did not affect the quality of PLMS. This result goes to show that being male and female does not matter in the quality of PLMS. Further, it is interesting to note that ownership of Android tablet, iPad, laptop, desktop, and Smartphone did not affect the quality of PLMS. The results imply that the degree of excellence in using PLMS can still be achieved even if users do not personally own the said technologies.

The test of differences among batches showed that all the five batches were the same in all those six factors or areas of quality. The result may suggest that the quality level of PLMS will be similar in the next batches of training, provided that there will be similar training conditions.

## **CONCLUSIONS**

The PLMS is a quality teaching tool to support reforms in managing learning resources and activities under the limited technological access. The PLMS is a fully-operational portable learning management system. It has the properties that comply with teaching requirements in higher education institutions. It conforms to the expected functional and nonfunctional requirements of a learning management system. It is very functional and highly usable, especially in managing resources and conducting activities offline. Further, PLMS is a highly efficient tool for teaching. It is optimized for use on removable drives that do not interfere with software installed on personal computers (What is a portable app?, 2016).

Achieving quality in any learning management systems is a shared responsibility. It is a responsibility between the teachers—who provide the requirements and the developers—who design the features. However, strict observance of software development standards must bridge between the two important entities.

## **RECOMMENDATIONS**

The study recommends the maximum utilization of PLMS. To do this, teachers must regularly practice all aspects of the learning management system. The development team should conduct regular trainings on the use and classroom integration of PLMS. More batches of training should be done not only in Central Visayas, Philippines but also in other regions.

There must be a follow-up quality testing among the respondents after the full integration of PLMS in their classes. The study also recommends performing quality testing from the students' perspective. In the same manner, the study recommends exploring other methods of quality testing as mentioned at the beginning of this article. Data sets of the quality testing results may be used to describe, predict, and derive teaching patterns and behaviors of teachers to support educational reform in learning management.

## **ACKNOWLEDGEMENTS**

The funding support provided by the Commission on Higher Education through the Philippine Higher Education Research Network (PHERNet),

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facilitated by Silliman University through the Research and Development Center is gratefully acknowledged. The technical expertise of Mark B. Onte, Janice Antoniette V. Forster, Jonathan Mark N. Te, and Maria Lourdes S. Curativo during the software development is highly appreciated. I am always grateful for the services of Alfie Arcelo and Dr. Pablito dela Rama. I am also delighted with the training and survey assistance of Fairy May Guiuan, Danielo F. Roquin, Dawn Iris Atienza Calibo, Jasper Catan, Ann Bev Berbosa, Jean Carrem Esparcia, Dr. Elve Nasvik, Dr. Sarah Fatima Valencia, Maria Estela Balbuena, Sister Mary Martha Fe, OSF, Fe Aparicio, Dr. Christine Cubillo, Nemesio Calacat, Mitch Fortich, and Maria Dara Saquin. Above all, I am grateful to all respondents who helped me in realizing this study. Further, I would like to thank the participants of the 2016 International Conference on Teacher Education held at the University of the Philippines — Dilliman on September 1–3, 2016 for their comments and suggestions on this paper.

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# Developing a Decision Support Application for Selecting New Scholars

**Jonathan Mark N. Te  
and Albert Geroncio Y. Rivera**  
*College of Computer Studies  
Silliman University*

The Scholarship Decision Support System was developed to allow the Scholarship and Student Aid Division (SSAD) of Silliman University to generate the general ranking list and valedictorian list that would provide support to the Scholarship and Aid Committee (SAC) in their deliberation for awarding scholarships to applicants. The decision support system provides a list that also matches an applicant to a scholarship based on the scholarship's requirements in terms of the course, gender, graduation honor, and province or region of origin.

In generating the ranking lists, the SSAD follows a rating system to determine the rank of each applicant. The applicant's high school general average, number of siblings, and parents' annual family income are taken into consideration and are given corresponding ratings based on the SSAD's criteria.

Microsoft Visual C# 2010 and MySQL Server 5.6 were used in developing the decision support system. After initial completion of the system, refinement was done through prototype reviews. The prototype reviews provided several improvements for the system that were not initially seen. The refinements were immediately taken into consideration and applied to the system.

Test cases were used to fully test if the features of the system work as originally intended. The test case results showed that all of the features worked and that the system had passed the test.

**Keywords:** Decision support, Applicant matching, Scholarship matching, List generation

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## INTRODUCTION

The Silliman University Scholarship and Student Aid Division (SSAD) is a unit in Silliman University that is responsible for the granting of scholarships to students. In a typical year, there would be about a hundred qualified applicants who would submit their application and credentials to the said unit in pursuit of availing a scholarship in order to enroll. Qualified applicants are ranked by the division, and the ranking list is endorsed to the Scholarship Aid Committee (SAC) for deliberation.

From the list of all qualified applicants, the SSAD prepares two separate lists: the general ranking list and the valedictorian list. The general ranking list contains all the qualified applicants ranked according to the SSAD's ranking system while the valedictorian list contains only qualified applicants who were awarded as valedictorians in their high school and ranked according to their high school grade average.

The primary problem of the SSAD is the generation of the two ranking lists in just two weeks. Two weeks is the available amount of time between the deadline of the submission of application and the SAC deliberation. The deadline of submission is always set on April 30 of every year to accommodate all high school graduates. With the dates of the registration for the new school year in mind, the SAC has to deliberate as soon as possible since the result of the deliberation can encourage the awarded applicant to actually continue to enroll in the university. On average, the SSAD accepts about a hundred applicants. Each applicant's rating score is calculated individually and all the applicants are sorted out according to the rating score to comprise the general ranking list.

In a typical year, there are about 20 scholarships that are awarded by the SAC to qualified applicants.

An applicant is considered to be qualified if he/she is able to satisfy the following minimum criteria: being in the top 10% of their high school graduating class; having a high school grade average of 87 and with no subjects having a grade below 80; and belonging to a household with a total annual income of not more than P250,000. An applicant who does not satisfy the minimum criteria is disqualified.

The SSAD ranking system involves giving corresponding ratings to the applicant's high school grade average, household annual income, and number of siblings. The ratings are shown in Appendix A.

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The applicant's rating for each category is added, and the total of the three ratings is used as basis for the ranking. The applicant with the lowest total score is the highest ranked applicant and so on.

## LITERATURE REVIEW

Decision support systems are meant to be support systems that decision makers can use in order to come up with a decision. Marakas (2003) has outlined several characteristics of a decision support system. From the number of characteristics, two are of note: A decision support system is intended to support decision makers rather than replace them and a decision support system supports all phases of the decision-making process.

As is the reason of most computerized systems, a decision support system can also shorten the time needed in making a decision, but it is also limited upon the computer system that it is running in, its design, and the data that is stored in it that can be used as the knowledge for generating the decision support (Marakas, 2003).

These are the considerations in defining the reasons for creating a decision support system: a decision support system has to have an intended purpose; a proposed decision support system has to have a context within which it will be used; and a decision support system has to have an outcome objective (Marakas, 2003).

Turban and Aronson (2001) also state that speedy computation is a reason for creating a decision support system. Also, a computer, in this instance, would allow for the performing of large numbers of computations quickly and at a low cost for the decision makers.

Turban and Aronson (2001) further add that a decision support system is a content-free expression and that the system would mean differently to different people.

DecisionSupportSystem.info, a website that encourages the use of decision support systems for organizations, defines the system as new applications that are computerized to act as a support system. Such support includes support for organizational and business decision-making. The site sells its own decision support system application, the Business Intelligence Suite, to support its cause for encouraging organizations to use such systems (Decision Support Systems, 2012).

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## SYSTEMS REVIEW

The University of Michigan's Administrative Information Services has developed a software application that allows the said university to match students with scholarships. In an article from 2007, the University of Michigan News Service described the system as being able to access all enrolled students, and when a scholarship is chosen, a list of all eligible students would pop up. (U-M develops, 2007).

There are several generic scholarship management softwares advertised on the Internet. Next Gen Web Solutions, Inc. and AcademicWorks, Inc. both feature a scholarship management software.

Next Gen Web Solutions' Scholarship Manager features multiyear functionality allowing access to two concurrent years of application processing, automated matching allowing the review of candidates who qualify for a scholarship, simplicity for students to complete the application process, centralized processing for the institution, and reliability, scalability, and security. The application is also described as a cloud-based solution (Scholarship Management, 2013).

AcademicWorks' Scholarship Management Software is also a cloud-based solution and is very similar to Next Gen Web Solutions' Scholarship Manager. AcademicWorks' solution adds the feature of allowing each donor to have a profile page for recognition (Scholarship Management, n.d.).

There are several other scholarship-matching softwares or websites which are not entirely the same with the three existing systems as stated in the previous paragraphs.

In Kent State University, their scholarship-matching webpage allows searching with the following criteria: college, major, high school grade point average, campus, state, country, ethnicity, gender, and age. The webpage can also specifically hide scholarships for athletics, music, military, and honors college. The search returns a match for a list of scholarships that an applicant can apply for in the university (Kent State, 2014).

Other websites have a wider coverage with how they match a scholarship to an applicant. These websites can include a search return for a scholarship and the university that the former is available for the application for the prospective student. They also offer searching for any available scholarship and providing a service of assisting the student in

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enrolling in an appropriate university or college with the said scholarship. These websites do not award the scholarship immediately since the student still has to apply for it. The matching is done by showing that the prospective student is eligible to apply for the said scholarship. ScholarMatch.org, Zinch.com, Niche.com, and ScholarshipExperts.com are such websites that offer the said service (What We, 2012; Scholarships, 2014; Origins and More, 2012).

Scholarship Management System is a web-based application developed by BS in Information Technology students for their Capstone Project. The application deals with the scholarships in the university. It also allows the SSAD to provide information about scholarships and also store the information of all the scholars who are enrolled in the university (Bastona, Liu, & Mascariñas, 2012).

## DISCUSSION

The considerations mentioned by Marakas (2003) were applied in this study. The intended purpose for the decision support system of the study was to provide support for the SAC members in the granting of the scholarships. The context of where the decision support system of the study was used was on deciding on the providing of grants for the scholarship applicants. The outcome objective of the decision support system of the study was the two ranking lists which were then used for generating the suggestion matching the qualified applicant to an open and available scholarship.

Next Gen Web Solutions' Scholarship Manager and AcademicWorks' Scholarship Management Software are both scholarship management software available for purchase. These are generic software applications that can be used as a solution for scholarship matching and records keeping.

Kent State University's scholarship-matching webpage matches several scholarships to a student applicant (Kent State, 2014). The other websites such as ScholarMatch.org, Zinch.com, Niche.com, and ScholarshipExperts.com do the same only that they are not connected to any university (What We, 2012; Scholarships, 2014; Origins and More, 2012). Their scholarship matching though is different since the applicant searches for a scholarship that would match to him/her and not the scholarship matching to possible applicants.

The University of Michigan's scholarship-matching system is the

closest inspiration of this study based on how a scholarship is matched to possible applicants.

## LIMITATIONS OF THESE STUDIES

The systems cited were all relevant but did not quite perform the task needed by SSAD. Furthermore, most of the systems were proprietary software and were not customized to the needs of the client. Only the University of Michigan system was developed for their own internal use.

## METHOD

This study aimed to observe and describe the effectiveness of the decision support system that emulates the manual ranking and rating system used by the SSAD in determining the ranking lists and providing the names of the qualified applicants for scholarships according to the specific preferences. To gather the necessary data, an interview was conducted with the SSAD unit head. Current forms collected included a sample application form that would be accomplished by the applicants and a sample of the ranking lists.

Test cases were used to test whether the features of the decision support system have been successfully implemented. Furthermore, the test cases verified whether the system had been able to emulate the ranking and rating system of the SSAD as well as to provide the correct suggestions of applicants matched to a scholarship. The test cases were accomplished by the users while being guided by the developer.

## EVALUATION

Test cases were administered to test if the features of the system were functioning as they were planned out to be before development. Actual applicant and scholarship data were used during the testing. The SSAD office assistant administered the testing by following all the instructions and checking the expected results. Other database-related results were shown to the office assistant during the testing.

The SSAD Decision Support System passed all the tests.

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## CONCLUSIONS AND FUTURE STUDY

The success of the features of the proposed decision support system through the test cases validates that the system has emulated the SSAD's process of generating the general ranking list and valedictorian ranking list. The ranking lists are easily generated through a module, thus reducing the time that is needed to produce the said ranking lists. The ability for the user to print the ranking lists provides the support that is essential for the Scholarship and Aid Committee in their deliberation when they award a scholarship to an applicant.

The system is also able to provide suggestions on the applicants that can be awarded a scholarship. This is also another essential support that is provided to the SAC during deliberation.

While this decision support system was developed as a separate system from the Web-based Scholarship Management System, an integration of the two systems would be a major recommendation going forward. The Web-based Scholarship Management System can provide the facility the inputs of the applicants' data which would then be used for the generation of the ranking lists and the suggestions for the scholarships. There could also be integration with the deliberation process. Once the SAC is able to decide on the awarding of the scholarship grant, the decision can be inputted immediately into the system rather than recording the award manually. The same can also be done with the renewal of scholarships.

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## APPENDIX A

### Criteria rating

Indicated below are the criteria used in generating the ranking.

**Table A1.** Student General Average and Rating.

| Student general average | Priority rating |
|-------------------------|-----------------|
| 97-100                  | 1               |
| 94-96                   | 2               |
| 91-93                   | 3               |
| 88-90                   | 4               |
| 85-87                   | 5               |

**Table A2.** Family Annual Income and Rating.

| Annual income (in pesos) | Priority rating |
|--------------------------|-----------------|
| Less than 70,000         | 1               |
| 70,001-128,000           | 2               |
| 128,001-186,000          | 3               |
| 186,001-244,000          | 4               |
| 244,001-300,000          | 5               |

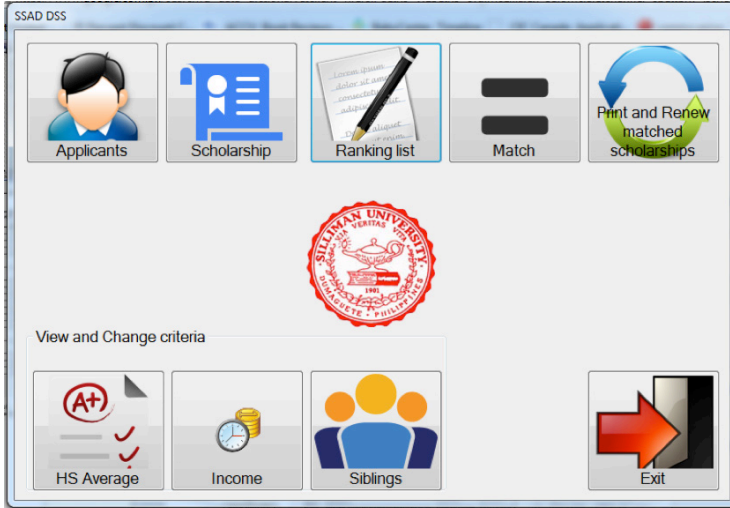
|                 |    |
|-----------------|----|
| 300,001–360,000 | 6  |
| 360,001–418,000 | 7  |
| 418,001–476,000 | 8  |
| 476,001–534,000 | 9  |
| 534,001–592,000 | 10 |
| 592,001–650,000 | 11 |
| 650,001–708,000 | 12 |

**Table A3.** Number of Siblings and Rating.

| Number of siblings | Priority rating |
|--------------------|-----------------|
| 9 and above        | 1               |
| 7–8                | 2               |
| 5–6                | 3               |
| 3–4                | 4               |
| 0–2                | 5               |

**APPENDIX B**

Application Screen Shots



**Figure1.** SSAD DSS Home Form. This figure shows the SSAD Application home form which has all the available options for the user.

**Figure 2.** Add Applicant Form. This figure shows the Add Applicant form which will allow the user to add applicants to the application.

**Figure 3.** Add Scholarship Form. This figure shows the Add Scholarship form which will allow the user to add scholarships to the application.

| Last Name | First Name        | High School                     | Year | Honor         | Graduates | 1st Choice | 2nd Choice | 3rd Choice |
|-----------|-------------------|---------------------------------|------|---------------|-----------|------------|------------|------------|
| Huang     | April Joy         | San Pedro Academy               | 2014 | Rank 2        | 78        | BS Accy    | BS CE      | BS Math    |
| De Tomas  | Glesanette Ghy    | San Pedro Academy-Recoletos     | 2014 | Rank 5        | 47        | NONE       | NONE       | NONE       |
| Gravador  | Raisa             | Tanjay High School (Legislated) | 2014 | Valedictorian | 121       | NONE       | BBA-Mgt    | NONE       |
| Galido    | Jahnmaine Shophie | Negros Oriental High School     | 2014 | Rank 2        | 630       | BS Accy    | NONE       | BS MT      |
| Dominado  | Julia Elizabeth   | Catherina Cittadini School      | 2014 | Rank 4        | 62        | BS MT      | BS Bio     | BS Accy    |
| Inovenon  | Annabelle         | Dauin National High School      | 2014 | Valedictorian | 23        | BSED-Math  | BS Accy    | BBA-Mgt    |
| Cafiete   | Richmond James    | La Consolation College          | 2014 | Valedictorian | 86        | BS Accy    | BS MT      | NONE       |
| Bassadre  | Alona             | Casa Marie                      | 2014 | Rank 2        | 43        | BS MT      | AB PolSci  | BSN        |

**Figure 4.** Ranking List Report Form. This figure shows the Ranking List Report form where the user can print the chosen ranking list.

Select scholarship  
Lexmark

Semester and School year  
Semester 1st  
School year 2014 - 2015

1. Wayne, Bruce - Rating: 4  
 2. Rizal, Jose - Rating: 6  
 3. Upton, Kate - Rating: 10

Print Assign scholarship Close

**Figure 5.** Match Form. This figure shows the Match form where the user can select a scholarship to view the matched applicants.

Select filter options  
Semester 1st Scholarship Lexmark  
School year 2014 - 2015 Update filter Reset

| Semester | School Year | Scholarship Name                        | Scholar Name           |
|----------|-------------|---|------------------------|
| 1        | 2014        | Abby Jacobs                             | Amigo, Cadness Jeanine |
| 1        | 2014        | Tenorio Memorial Foundation Scholarship | Wayne, Bruce           |
| 1        | 2014        | Tenorio Memorial Foundation Scholarship | Howlett, James         |
| 1        | 2014        | Tenorio Memorial Foundation Scholarship | Durant, Kevin          |
| 1        | 2014        | Lexmark                                 | Upton, Kate            |

Print Renew scholarship Close



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# The Effect of Clinical Simulation on the Cognitive Learning Abilities of Undergraduates of Silliman University College of Nursing

Barbara Lyn A. Galvez, Kathleah S.  
Caluscusan, and Renee Felisa O. Teh  
*Silliman University College of Nursing*

This paper will describe the effect of clinical simulation using high-fidelity patient simulator on the cognitive learning abilities of undergraduates of Silliman University College of Nursing based on their performance in written tests. The test scores in the pretest were compared with the result in the test scores after the conduct of simulation in the experimental group. The results derived from the experimental group were compared with the test results of the control group that did not undergo simulation. The test scores indicated that clinical simulation was irrelevant as an additional learning strategy to enhance their knowledge base. The clinical simulation with the use of high-fidelity patient simulator did not enhance the cognitive knowledge these students (N = 31) already possessed especially when their knowledge base was already concreated by other methods. Mastery level of the concept and subject matter harnessed by other methods was more effective than applying the same to a near or close to real scenario using a high-fidelity simulator.

**Keywords:** clinical simulation, cognitive learning abilities, high-fidelity patient simulator, nursing education

## INTRODUCTION

The potential risks to patients associated with learning at the *bedside* such as the administration of parenteral injection on a classmate/partner are becoming increasingly unacceptable because of ethical concerns. The search for innovative education and training methods that do not expose the patient

to preventable errors continues. All the evidence shows that a significant proportion of adverse events in health care is caused by problems relating to the application of the *non-technical* skills of communication, teamwork, leadership, and decision-making. The increasing use of technology in health care and higher public and patient expectations have both encouraged the development and use of innovative educational methods in healthcare education (Lewis, Strachan, & Smith, 2012).

In this decade, technologies that were not available when the present-day educators went to nursing schools are widespread; an integration of the same is already apparent in most nursing colleges and schools in the Philippines. The Silliman University College of Nursing (SUCN) for one has adapted to the challenge of using high-fidelity patient simulators in the curriculum. Miller and Bull (2013) stated that “simulation based education (SBE) in health care is gaining popularity and provides an opportunity for students to acquire and practice clinical skills in a safe and controlled environment” (p. 241) This is not however a guarantee that learning is sure to take place especially on the cognitive level. Glidewell and Conley (2014) expressed that “although there are numerous studies that examine the relationship between simulation and student success, most focus on the affective and psychomotor domains of learning” (p. 23). This gives us the message that, while there is growing evidence of the value of simulation to learners, there is little understanding of the factors that influence academics or cognitive ability. It is further shown that other domains of learning must be inspected in terms of appreciating the success of the use of patient simulation. There is then a research gap in the cognitive aspect, as an equally important domain of learning. The researchers identified the relationship between the use of high-fidelity patient simulators and the academic test scores of students. This will secure evidence on the area of cognitive ability as an important learning outcome and the move to utilize high-fidelity patient simulator of specific scenarios in the teaching–learning activities of the students. Specifically, the following questions were answered:

1. What is the demographic profile of level III students of Silliman University College of Nursing in terms of the following variables?
  - a. Age
  - b. Gender
  - c. Professional subject grade point average (PsGPA)
2. Is there a significant difference between the pretest and posttest scores

- in the control group?
3. Is there a significant difference between the pretest and posttest scores in the experimental group?
  4. Is there a significant difference between the mean scores of the pretest and posttest between the two groups?
  5. Is there a significant relationship between the students' cognitive ability and their exposure to clinical simulation?

## **HYPOTHESES**

It is generally hypothesized that clinical simulation has no significant effect on the improved cognitive learning abilities of students. Specifically, the following hypotheses were tested:

1. There is no significant difference between the scores in the pretest and posttest of the control group.
2. There is no significant difference between the scores in the pretest and posttest of the experimental group.
3. There is no significant difference between the mean scores of the pretest and posttest between the two groups.
4. There is no significant relationship between the students' cognitive ability and their exposure to clinical simulation.

The participants of this study were 31 level III students of SUCN. The students were exposed to the concepts of specific pathological alterations in their Nursing Care Management 104 (NCM 104) course and, for this study specifically, the concepts of perception and coordination. The researchers used a 20-item critical thinking questions test made by an expert (Master of Arts in Nursing, Major in Adult Nursing) on the topic of pregnancy-induced hypertension (PIH) preeclampsia with perception and coordination to measure the cognitive abilities of the students based on assessment utilizing the nursing process. The learners cared for a 35-year-old female who was then 36 weeks pregnant with her first child. She had been experiencing symptoms of preeclampsia for the past two weeks and had been managed on an outpatient basis; however, because of increasing edema and blood pressure, she had been hospitalized. She was treated with magnesium sulfate and hydralazine, but her condition did not improve. This simulated clinical experience (SCE) consisted of three states that



were transitioned manually at the facilitator's discretion, with the exception of state 2 after magnesium sulfate, which transitioned automatically to state 3 after hydralazine was administered. The SCE ended with the patient's labor being induced. With manual transitions, the facilitator advanced to the applicable state when appropriate interventions were performed. This SCE prepared the learner for the following:

1. Safe and effective care environment
  - a. Management of care
  - b. Safety and infection control
2. Health promotion and maintenance
3. Psychosocial integrity
4. Physiological integrity
  - a. Basic care and comfort
  - b. Pharmacological and parenteral therapies
  - c. Reduction of potential risks
  - d. Physiological adaptations

A case scenario was adapted from the Program for Nursing Curriculum Integration (Ravert, 2002). The virtual laboratory coordinator, whose expertise exposed him to several intensive trainings on facilitation of clinical simulation and case scenario-making under Dr. Sharon Decker, Professor and the Director of Clinical Simulations at Texas Tech University Health Sciences Center in Lubbock, Texas, was in charge of facilitating students' learning through simulation. He was also trained by CAE Healthcare Company, the manufacturer of the high-fidelity patient simulator.

## **THEORETICAL CONSIDERATIONS**

Seropian (2012), as cited in Secomb, McKenna, and Smith (2012), defined simulation as "the imitation of real life practice" (2003, p. 1698). There is the creation of a situation similar to a real scenario with either the use of high-fidelity patient simulator or human patient simulators who are trained. Hovancsek (2007), as cited in Cant and Cooper (2010), describes that the aim of simulation is "to replicate some or nearly all of the essential aspects of a clinical situation so that the situation may be more readily understood and managed when it occurs for real in clinical practice" (p. 145). Cant and Cooper (2010) had the occasion to

define simulation using standardized patients as a method that “uses case studies and role playing in the simulated learning experience; individuals, students or paid actors are taught to portray a patient in a realistic and consistent manner” (p. 3). With this teaching technique, the learners are not threatened by the risk they are confronting in the real situation. And because of the processing of their learning experiences after each exposure, there is a wide acceptance of this method. Simulation, in fact, has been endorsed by nursing professional bodies (National Council of State Boards of Nursing, 2005).

Secomb, McKenna, and Smith (2012 as cited in Ravert, 2002; Billings & Halstead, 2012; Cioffi, Purcal, & Arundell, 2005), however, discussed how literatures are so assuming in their claim that computer-based simulation activities form a self-instruction method that can increase cognitive abilities. They further mentioned that no study that specifically looked into this area or has explicitly tested this assumption has provided evidence for practice. In the current systematic reviews conducted by Lapkin, Levett-Jones, Bellchamber, and Fernandez (2010) and Cant and Cooper (2010), it was acknowledged that there is a need for evidence on the effectiveness of using simulation mannequins in the teaching of clinical decision-making skills to undergraduate nursing students. They were specific in their report that the lack of evidence must call for more studies that would measure the effectiveness of simulation as an educational strategy. The objective of the study was to be able to ensure and support the claim that simulation would improve the knowledge and skills of undergraduate nursing students (Lapkin, Levett-Jones, Bellchamber, & Fernandez, 2010; Cant & Cooper, 2010). This is a rather sad fact of what is assumed to be a full-proof learning strategy.

It is also encouraging to note that there are also evidences that will positively support the use of clinical simulation in knowledge acquisition. Ravert (2002) in his study of researches showed that “the review indicates that 75% of the studies showed positive effects of simulation on skill and/or knowledge acquisition” (p. 203). In the systematic review of Cant and Cooper (2010), it was found that all 12 study reviews have reported statistical improvements in knowledge/skill, critical thinking ability, and/or confidence after the simulation education, indicating that simulation is an effective method of teaching and learning. It was also found in the abovementioned review that, out of nine studies assessing the effect of simulation on knowledge, four showed statistically significantly higher means for the experimental group compared with those for the control group.

Good (2003) discussed that “patient simulators are increasingly used in

the education and training of physicians, nurses, emergency care personnel, and many other health care professionals” (p. 21). This is a statement that will show the effective acquisition of not only basic skills among undergraduate students but also advanced clinical skills using patient simulation. The need then to fill the gap as to the area of cognitive learning is a challenge and needs an urgent attention.

The social cognitive theory of John Dewey formed the structure of this study. Dewey believed that students thrive in an environment where they are allowed to experience and interact with the curriculum, and all students should have the opportunity to take part in their own learning. In addition to his ideas regarding what education is and what effect it should have on society, Dewey also had specific notions regarding how education should take place within the classroom. In *The Child and the Curriculum* (1902), Dewey discusses two major conflicting schools of thought regarding educational pedagogy. The first is centered on the curriculum and focuses almost solely on the subject matter to be taught. Dewey argues that the major flaw in this methodology is the inactivity of the student; within this particular framework, “the child is simply the immature being who is to be matured; he is the superficial being who is to be deepened” (1902, p. 13). He argues that, in order for education to be most effective, content must be presented in a way that allows the student to relate the information to prior experiences, thus deepening the connection with this new knowledge. Dewey had always stressed the importance of recognizing the significance and integrity of all aspects of human experience (<http://www.iep.utm.edu/dewey/>). This is an inspiring theory for the use of clinical simulation considering that experiences become part of the learning of the students. Students will most likely remember actual occurrences especially when they are actively involved in the process. With this theoretical framework as the backbone of this study, the measure of cognitive learning will be quantified in the scores of the test administered.

## **METHODS**

This quasi-experimental study evaluated the effect of clinical simulation on the cognitive learning abilities of the level III students as measured by their academic test scores. The researchers used a 20-item critical thinking question test made by an expert on the topic of pregnancy-induced hypertension (PIH) preeclampsia with perception and coordination to

measure the cognitive abilities of the students based on assessment utilizing the nursing process. The test scores in the pretest were compared with the result in the test scores after the conduct of simulation in the experimental group and then compared with the test result of the control group that did not undergo simulation. To determine if a significant difference exists between pre- and posttest scores in the control group or in the experimental group, the t test for paired observations was utilized at 0.05 level of significance. The test was employed on the assumption that the sample differences come from the population of such differences that are approximately normally distributed. In the test for significance of the difference between means of related samples, the nonparametric statistical tool Wilcoxon signed-rank test was utilized.

As regards the test for significance of the difference between control and experimental groups' performance, the t test for independent samples was employed at 0.05 level of significance; it was based on the assumption that the two samples come from normally distributed population.

To verify whether a significant relationship or association exists between two variables dealing with categorical data, chi-square test of independence at 0.05 level of significance was employed.

The cognitive learning abilities of the students were appreciated in quantifiable terms as an evidence that active learning is taking place. The conduct of the clinical simulation was perceived to improve their scores on the 20-item test that was administered before the simulation. The strength of the assumption that clinical simulation can significantly affect the cognitive learning ability of the learners was tested. Simulation entails the active integration of knowledge acquired through other strategies like self-study and/or socialized discussion. In the theory of John Dewey, the importance of how one recognizes the significance of an experience will spell the difference in the learning process; thus, the active involvement of the person is valuable. The significant improvement of the students' test scores prior to the simulation compared with those after the clinical experience will be tested to affirm the theory. The researchers tested this theory using the conceptual model illustrated in Fig. 1.

The study was conducted at the Mary Marquis Smith Hall, room 303, at the Silliman University College of Nursing (SUCN), Silliman University. Silliman University is a nonstock, and nonprofit educational institution guided by the vision of being a leading Christian institution committed to

total human development for the well-being of society and environment. The SUCN is a center of excellence in nursing education granted by the Commission on Higher Education (CHED).

The participants of this study were 31 level III students of SUCN. The students were exposed to the concepts on pathological alterations in their NCM 104 course and, for this study, specifically on the concept on alterations in perception and coordination. The test scores obtained in this study were not included in the marks for grading. These students did not undergo simulation as part of their usual teaching–learning activities. They only went through a lecture–discussion on the specific concept. In this study, an additional methodology of a review of the previously discussed concept (a 1.5-hour lecture) for both experimental and control groups and simulation using high-fidelity patient simulator for the experimental group were introduced as part of their learning activities.

The researchers used a 20-item testing tool that covers the subject matter on the concept on perception and coordination. The researchers ranked the students based on their PsGPA in the past semester and grouped all first and second elements to the control and experimental groups, respectively, to ensure homogeneity in the composition between groups. The participants in this study have the following characteristics:

1. Enrolled in NCM 104;
2. Willing to participate in the study;
3. Must understand either Cebuano, Visayan, or English instructions; and
4. Must be 18 years old and above

This study was guided by the universally accepted ethical principles in conducting researches. No amount of harm was inflicted upon the participants nor were they forced or coerced to participate in the study. Their written informed consent as participants was secured, and all their rights pertinent thereto were observed throughout the conduct of the study. The study was submitted for review in the University's Ethics Board. All recommendations were integrated into the actual conduct of the study including the security of academic performances of the participants. All information gathered in this study was treated with utmost confidentiality.

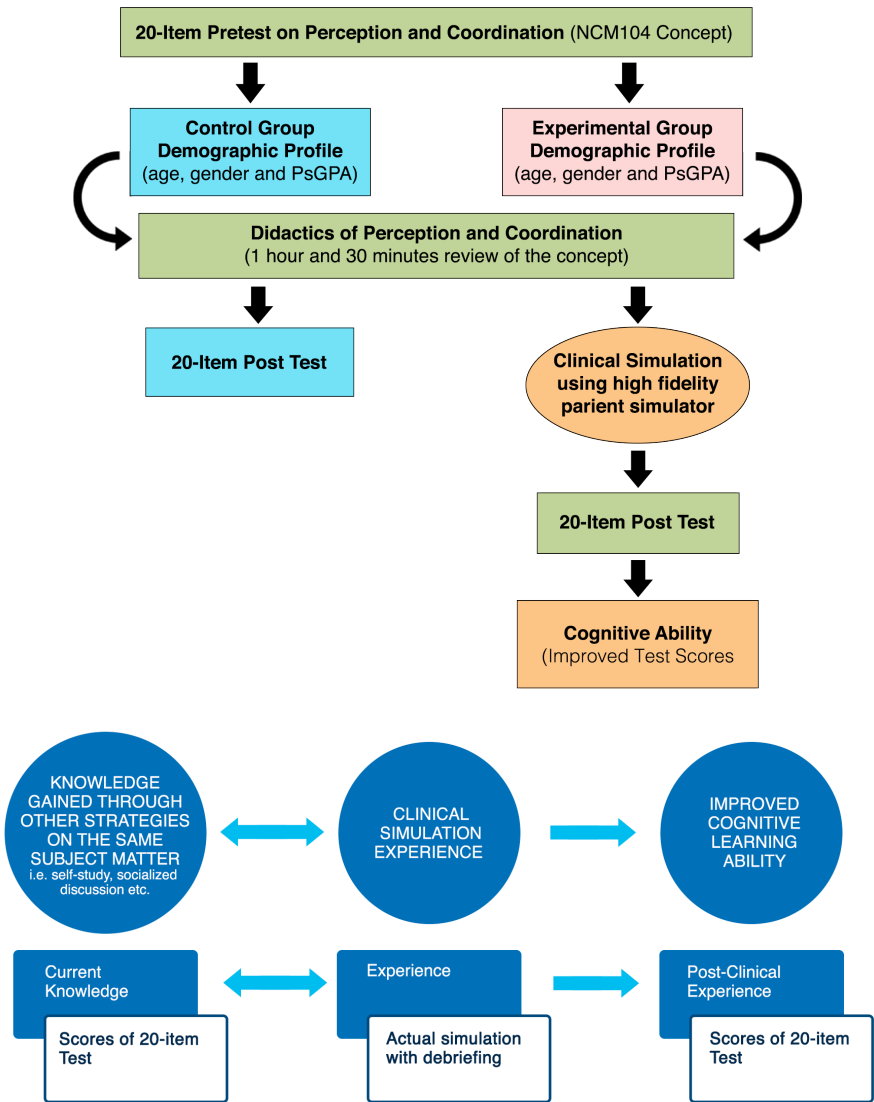


Figure 1. Conceptual Model

As shown in Fig. 1, the current knowledge gained from the learning strategies outside of the clinical simulation was the basis of observation. This is made quantifiable by the scores the students obtained in the 20-item pretest. The students under the experimental group were then exposed to a clinical simulation experience. In the experience, the students were expected to integrate their current knowledge to a scenario that mimics real-life situation. They were considered actively involved in the learning process, and based on the theory of

John Dewey, in order for learning to be most effective, content must be presented in a way that allows the students to relate the information to experiences, thus deepening the connection with this new knowledge. This was hypothesized to lead to a new knowledge that is posited to have improved their cognitive learning abilities as reflected in an improved score in the posttest compared to those who were not exposed to clinical simulation.

## RESULTS AND DISCUSSION

The age of the participants ranged from 18 to 32 years old. There were 17 out of the 27 participants who were below the age of adulthood which is 20 years old. All others were in the young adulthood stage of 20–40 years old. In the experimental group, 11 (73.33%) were in the 18–20-year-old range, 2 (13.33%) were in the 21–23-year-old range, and 1 (6.67%) in both the 24–26- and 27–29-year-old age range. The control group has 10 students (62.50%) belonging in the 18–20-year-old range, 4 (25%) in the 21–23-year-old bracket, and 1 (6.25%) each in the 27–29- and 30–32-year-old age range. The expected ages of students who are now in their third year in college is 19–20 years old while those who were 21 years old and above were either second coursers, returning students from a leave of absence, or repeaters.

There were 27 female students and 4 male students who participated in the study. The study participants were mostly female from both the experimental and control groups. Out of the 15 participants in the experimental group, 13 are female. Of the control group, 14 out of 16 were female. Both groups have two males each.

The lowest PsGPA is 2.2 while the highest is 3.2. There were 12 participants in the experimental group whose PsGPA belongs to the 2.2–2.5 range, 2 in the 2.51–2.8 range, and 1 in the 2.8–3.2 range. Among those in the control group, there were 11 participants in the 2.2–2.5 range, 4 in the 2.51–2.8 range, and 1 in the 2.8–3.2 range. Except for those in the 2.51–2.8 range where the difference is half (2 against 4), the 2.2–2.5 range (12 against 11) have more or less a similar number (Table 1). The grade point average of the professional subjects already taken by the students was used as a basis for distributing them equally to the experimental and control groups. The PsGPA of 4.0 is the highest possible mark that a student can obtain, and a PsGPA of 2.0 is the required average for a student to be retained to continue the course.

**Table 1.** Profile of Respondents

|                | Experimental group (%) |                 | Control group (%) |                 |
|----------------|------------------------|-----------------|-------------------|-----------------|
| <b>Age</b>     |                        |                 |                   |                 |
| 18-20          | 11 (35.48)             |                 | 10 (32.25)        |                 |
| 21 and above   | 4 (12.9)               |                 | 6 (19.35)         |                 |
| <b>Gender</b>  |                        |                 |                   |                 |
| Female         | 13 (41.9)              |                 | 14 (45.16)        |                 |
| Male           | 2 (6.45)               |                 | 2 (6.45)          |                 |
| <b>PsGPA</b>   |                        |                 |                   |                 |
| 2.2-2.5        | 12 (38.70)             |                 | 11 (35.48)        |                 |
| 2.51 and above | 3 (9.68)               |                 | 5 (16.12)         |                 |
| <b>Scores</b>  | <b>Pretest</b>         | <b>Posttest</b> | <b>Pretest</b>    | <b>Posttest</b> |
| 11-14          | 8                      | 10              | 9                 | 8               |
| 15-20          | 7                      | 5               | 7                 | 8               |

The pretest scores between the experimental and control groups registered a p value of 0.651 which is not significant. The posttest scores between the experimental and control groups have a p value of 0.491 which is also not significant. The mean of the pre- minus posttest scores of the experimental and control groups revealed a p value of 0.961 which is not significant.

**Table 2.** Test for significance of difference between means of independent samples.

| Variables              | Compared groups       |                       | Results                   |
|------------------------|-----------------------|-----------------------|---------------------------|
|                        | Experimental          | Control               |                           |
| <b>Pretest scores</b>  | <b>Mean = 11.2667</b> | <b>Mean = 11.6875</b> | $\sigma_1^2 = \sigma_2^2$ |
|                        | sd = 2.81493          | sd = 2.30127          | $t = -0.457$              |
|                        |                       |                       | $p$ value = 0.651         |
|                        |                       |                       | Not significant           |
| <b>Posttest scores</b> | <b>Mean = 13.800</b>  | <b>Mean = 14.25</b>   | $\sigma_1^2 = \sigma_2^2$ |
|                        | sd = 1.61245          | sd = 1.9494           | $t = -0.698$              |
|                        |                       |                       | $p$ value = 0.491         |
|                        |                       |                       | Not significant           |



|                                       |                      |                       |                           |
|---------------------------------------|----------------------|-----------------------|---------------------------|
| <b>Pre-minus<br/>posttest results</b> | <b>Mean = -2.533</b> | <b>Mean = -2.5625</b> | $\sigma_1^2 = \sigma_2^2$ |
|                                       | sd = 2.16685         | sd = 1.82460          | $t = -0.041$              |
|                                       |                      |                       | $p$ value = 0.968         |
|                                       |                      |                       | Not significant           |

The study revealed that there is no significant difference in the mean scores of both the experimental and control groups and in the pretest and posttest mean scores in the two groups.

As shown in Table 2, the  $p$  value of 0.651 was recorded in the comparison of mean scores in the pretest between the experimental and control groups. This is expected by the researchers considering that both groups were organized to be homogenous based on the selection process. The ranking of their PsGPA was done and was alternately distributed to the control and experimental groups based on the ranking. The participants were also exposed to the topics covered in the pretest since they were discussed in level II. Basing on Dewey’s model, this forms part of the previous knowledge or knowledge base of the participants.

The  $p$  value of 0.491 was recorded in the mean scores of the posttest results between the experimental and control groups. The hypothesis is thus accepted that there is no significant difference in the introduction of clinical simulation in the cognitive ability of the study participants. The control group who did not undergo clinical simulation recorded a mean score of 2.5625 while the experimental group was 2.533. The results suggest that there is no significant difference in terms of the scores. The pretesting tool and posttesting tool utilized were the same. The control group took the posttest right after the review while the experimental group took the posttest later in the afternoon after their clinical simulation exposure.

According to Johnson and Johnson (1986), there is persuasive evidence that cooperative teams achieve at higher levels of thought and retain information longer than students who work quietly as individuals. The shared learning gives students an opportunity to engage in discussion and take responsibility for their own learning, thus they become critical thinkers (Totten, Sills, Digby, & Russ, 1991); this is seen as attributable to the homogeneity of the group in terms of cognitive ability and the irrelevance of additional learning strategy such as clinical simulation to enhance their knowledge base. The clinical simulation is more focused on enhancing the

application of this knowledge to improve affective and psychomotor domains of learning.

Participants from both groups underwent a lecture on the topic in their regular classes. They were given a review on the specific topic for 1 hour and 30 minutes on the day they will take the test. There was an interval of 5 hours and 30 minutes in taking the posttest by the experimental group whereas the control group took the posttest 30 minutes after the review of the topic. Explicit measures of human memory, such as recall or recognition, reflect conscious recollection of the past. Implicit tests of retention measure transfer (or priming) from past experience on tasks that do not require conscious recollection of recent experiences for their performance (Roediger, 1990). The posttest must be administered at the same time, after the lapse of the same period of time, and the control group was not allowed to review further by themselves in the interim.

The pre- minus posttest results recorded a p value of 0.968. This showed that the intervention which is the exposure to clinical simulation did not effectively create a difference in terms of the resultant scores in the posttest. This is seen again as a reminder that cognitive domain cannot be improved with the use of clinical simulation especially when the knowledge base of these students was already concreted by other methods. Once the cup is full, it can no longer be added with so much more. The clinical simulation with the use of high-fidelity patient simulator did not enhance the sufficient cognitive knowledge these students already possessed. Mastery level of the concept and subject matter harnessed by other methods is more effective than applying the same to a near or close to real scenario using a high-fidelity simulator. Studies have shown that bringing learners together in a simulation scenario can improve communication, decision-making, judgment, and leadership skills (Moorthy, Munz, Adams, Pandey, & Darzi, 2005). "That, although clinical simulation is resource heavy, it has been shown to be feasible and instructive technique for teams (Hunt, Heine, Hohenhaus, Luo, & Frush, 2007). Improved individual and team responses were appreciated in both individuals and teams in acute and ambulatory care (Creutzfeldt, Hedman, Medin, Stengard, & Fellander-Tsai, 2009), making simulation more beneficial and effective in developing skills."

Tables 2 and 3 show that there were significant differences in the means of the pretest and posttest scores in both groups. The mean of the pretest against the posttest in the experimental group revealed a significant value.

The same is true when the pretest and posttest means in the control group were tested for significance. This shows that there is no difference in the performance of both groups in terms of test scores in the pre- and posttests. This further shows that clinical simulation as an intervention introduced to the experimental group has not generated a significant difference compared with that of the control group which registered a significant increase in their mean scores against the pretest. This shows that, although a significant increase in the test scores was appreciated after exposure to clinical simulation in the experimental group, there was also a significant increase in the test scores in the control group even if they were not exposed to clinical simulation. Aggarwal et al. (2010) stated that it is currently accepted that simulators serve as an adjunctive tool and not a replacement of other teaching methodologies. This is again conclusive of the results of the study that the introduced intervention was not effective in making a difference in terms of enhancing cognitive ability of the students.

In terms of raw scores, the posttest marks of the students in the control group were higher than those of the experimental group, considering the difference in the amount of time in the conduct of the posttests. The control group took the posttest 2 hours and 30 minutes after the pretest and 30 minutes after the review while the experimental group took the posttest 7 hours and 30 minutes after the pretest, 5 hours and 30 minutes after the review and underwent the rigors of clinical simulation. This can be reflective of how recent recall of concepts can assist in recalling/retention of memory that can assist in getting high scores compared to the pretest.

**Table 3.** Test for significance of difference between means of related samples.

| Groups       | Compared results |                | Results                      |
|--------------|------------------|----------------|------------------------------|
|              | Pretest          | Posttest       |                              |
| Experimental | Mean = 11.2667   | Mean = 13.8000 | Mean of differences = -2.533 |
|              | sd = 2.81493     | sd = 1.61245   |                              |
|              |                  |                | <b>Wilcoxon test:</b>        |
|              |                  |                | $z = -2.939$                 |
|              |                  |                | $p$ value = 0.003            |
|              |                  |                |                              |

|                |               |              |                                |
|----------------|---------------|--------------|--------------------------------|
|                |               |              | <b>t test:</b>                 |
|                |               |              | $t = -4.528$                   |
|                |               |              | $p$ value = 0.000              |
|                |               |              | Significant                    |
| <b>Control</b> | Mean = 13.800 | Mean = 14.25 | Mean of differences = -2.53625 |
|                | sd = 1.61245  | sd = 1.9494  | $t = -5.618$                   |
|                |               |              | $p$ value = 0.000              |
|                |               |              | Significant                    |

The test for significance of the relationship between the exposure of the participants to clinical simulation and their cognitive ability revealed a  $p$  value of  $-0.968$  which is not significant. This means that the cognitive ability of students and their exposure to clinical simulation are not related significantly. The exposure of students to clinical simulation has no significant effect on the students' performance in the examination. The scores obtained in the posttest among the participants in the experimental group cannot be attributed to the exposure to clinical simulation. This will again confirm the effective admission screening implemented by the unit in the selection of the students. This also shows that the participants are on the same baseline level as to their knowledge as reflected by their homogenous grouping in terms of their PsGPA. They reflect the same capability to learn with or without additional exposure to clinical simulation that will cement their theory base. This is the gap in the theory and in application as a process of cementing and enhancing knowledge. It could be argued that beginning nursing students will have a higher need and lesser knowledge and skills to pin their simulation experience in comparison with more experienced and knowledgeable senior students.

**Table 4.** Test for significance of the relationship between two variables.

| Posttest scores | Treatment    |         | Results                  |
|-----------------|--------------|---------|--------------------------|
|                 | Experimental | Control |                          |
| 11-12           | 3            | 3       | $r_{\text{eta}} = 0.008$ |
| 13-14           | 7            | 5       | $r_{\text{pb}} = -0.008$ |
| 15-16           | 4            | 6       | $p$ value = 0.968        |
| 17-18           | 1            | 2       |                          |

|       |    |    |                 |
|-------|----|----|-----------------|
|       |    |    | Not significant |
| Total | 15 | 16 |                 |

As shown in Table 4, there were three participants exposed to clinical simulation that recorded posttest scores of 11–12, 7 had 13–14, 4 with 15–16, and 1 had 17–18, while the participants who were not exposed to clinical simulation recorded the following scores: 3 had 11–12, 5 had 13–14, 6 had 15–16, and 2 had 17–18. Statistical analysis revealed that, with a p value of 0.968, there is no significant relationship between the two variables. The cognitive ability of the students and their exposure to clinical simulation are not related significantly. The utilization of clinical simulation in the improvement of knowledge cannot be inferred. A high score in the posttest cannot be associated with one's exposure to simulation. This affirms the selection process during the admission of students to SUCN. The stringent measures adopted in the selection process to ensure that the cognitive capabilities of those admitted are of the same level. They were given the same baseline knowledge and reinforcement in the form of a review. The simulation did not significantly affect their appreciation of the knowledge gained from the strategy. It is good to note that, in the experimental group, there was a considerable increase in the students' earned points in the posttest. There were 3 who got at least 15 correct marks in the pretest, and this increased to 5 in the posttest. The control group has marked a higher data wherein only 2 got at least 15 correct marks in the pretest, but there were 7 who got at least 15 in the posttest. This can be attributed to the fact that the participants in the control group had the time to recall their pretest mistakes during the posttest which was administered only after a shorter period of time than that of the experimental group. They were not exposed to a stressful situation like what the experimental group went through.

The exposure of students to clinical simulation has no significant effect on their cognitive ability. Other methods of learning like lecture-discussion and self-study remain sufficient in the grasp of specific concepts. Clinical simulation is more inclined to the improvement of psychomotor and affective skills as previous studies will show that there is a need to alter teaching methods to fit the demands of the student learners today (Medley & Horne, 2005). Simulation is an innovative and technologically advanced teaching and learning approach that combines a problem-based approach with experiential learning where the student learns through "doing," "experiencing," and utilizing

their knowledge base, psychomotor skills, and clinical decision-making based on the information before them (Edgecombe, Seaton, Monahan, Meyer, LePage, & Erlam, 2013). Jeffries (2007) further stated that “simulation is a practice that resembles reality and has existed in nursing education in many forms” (p. 10).

## CONCLUSIONS

The exposure of students to clinical simulation has no significant effect on their cognitive ability. Although there is a slight improvement as far as the posttest results between the experimental and control groups are concerned, this is not enough to justify a correlation between clinical simulation and cognitive ability. Other methods of learning like lecture-discussion and self-study remain sufficient in the grasp of specific concepts as shown in this study.

The program coordination in the University must emphasize the use of clinical simulation in enhancing psychomotor and affective skills and in addition to cognitive abilities of the students. Since nursing is a practice profession, the use of high-fidelity mannequin is utilized to mark and evaluate performance of students; it must be on the skills only and must not capitalize on theory. Although basic knowledge of a specific clinical simulation scenario is needed to appropriately intervene, there is no guarantee that such cognitive grasp of the knowledge will be further enhanced by the clinical simulation exposure. The goal of any educational intervention, whether it is a focused skill, simulation-based scenario, clinical decision-making, or team work exercise, is to increase the knowledge and breadth of the students' learning. From this, the teacher needs to utilize the best practices in using simulation as a teaching method. The Commission on Higher Education Memorandum provides that simulation is encouraged but will not replace the classroom and clinical hands on experience.

Simulation is an interactive and innovative teaching and learning strategy that has an opportunity to provide effective consolidation of clinical knowledge and skills into nursing practice. As a teaching method, simulation requires thorough planning and organization to ensure relevance to clinical nursing practice, the student participants, and the clinical environment. There must be strict adherence to carefully constructed scenarios.

It is necessary for simulation-based training to be fully integrated and funded within training programs for clinicians at all stages. It is also necessary

to train the trainers through the development of a skilled faculty of expert clinical facilitators, supported by adjunctive support staff in dedicated simulation suites. Further research is needed to extend the use of simulation to serve as a tool in identifying credentialing in specialized areas, revalidation of previously learned skill, and learning new technologies. There must also be a move away from using experience as a proxy for competence. The analysis and evaluation of a practitioner's skills must be done regularly and must be continuous with competence being a work in progress and elusive in nature.

## RECOMMENDATIONS

This study may be replicated by other researches by using a larger number of participants to make the study more rigorous. In addition, participants from other nursing schools may be included in the sample to initiate the adoption of simulation-based education.

## ACKNOWLEDGMENTS

This research project was made possible through a research grant from the Silliman University Research and Development Center. The comments and suggestions of anonymous reviewers that helped in improving the content and presentation of this paper are also appreciated. The ideas expressed here, however, are those of the authors and do not necessarily reflect the views of Silliman University.

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# Exploring incivility as experienced by faculty and staff of Silliman University

**Michele Joan D. Valbuena, Lourdes  
Angela F. Pinero, Chizanne Sarabia-  
Ridad, Rochelle Marie C. Remollo,  
Louie Blake S. Sarmiento**

*Psychology Department, Silliman University  
Dumaguete City, Philippines*

Incivility in the workplace has become of interest in industrial/organizational psychology research to understand employee welfare and design programs to develop employee wellbeing. A mixed method design was employed with faculty and staff at a private university in Central Philippines; a survey questionnaire was administered to measure their experiences of incivility and how these were related to their levels of burnout. While generally the faculty and staff reported not experiencing incivility and not associated with their average-to-low levels of burnout, the qualitative interviews indicated that respondents did not only experience incivility but also bullying. It was found that the faculty and staff of Silliman University did not understand what incivility really was, misconstruing the behaviors as bullying, hence the inconsistency on the data between the quantitative and qualitative researches. It is recommended that another survey study be done with a more robust research procedure.

**Keywords:** incivility, bullying, burnout, teaching, employee wellbeing

## INTRODUCTION

Incivility continues to be an important interest in research. In more recent studies, incivility has been examined in association with passive leadership (Harold & Holtz, 2015); school climate (Powell, Powell, & Petrosko, 2015); higher, continuing, and professional education (Misawa & Rowland, 2015); health sciences faculty membership (Wright & Hill, 2015); advice, leadership, and

performance (Porath, Gerbasi, & Schorch, 2015); gender and race (Johnson-Bailey, 2015); and gender and work withdrawal (Loi, Loh, & Hine, 2015). In earlier studies, incivility was studied along with job satisfaction and total quality management (Morrow, Elroy, & Scheibe, 2011); psychological distress and self-evaluation (Lim & Tai, 2013); and norms, safety climate, and outcomes (McGonagle et al., 2014). One study investigated individual and organizational moderators of incivility (Zhou et al., 2014), and a recent one explored positive buffers between incivility and employee outcomes (Sliter & Boyd, 2015). In the attempt to understand in more depth what workplace incivility really is and why it occurs, a concept analysis was done using 50 studies that addressed incivility at work (Vagharseyyedin, 2015). The common themes that emerged were ambiguous intent, violation of mutual respect, and low intensity physical assault. Organizations suffer financial losses and employees demonstrate reduced citizenship performance, psychological distress, and anxiety.

## RELATED LITERATURE

Incivility has been found to result in undesirable outcomes in the worker and in the organization. Research has indicated that targets (recipients of incivility) suffer from negative affective states like being depressed, disappointed, moody, ‘in a black cloud,’ irritated, or hurt (Pearson et al., 2001). They may also feel alienated and may instigate intimidation towards the instigators (actors of incivility). An emergency medical professional interviewee reported, “Incivility has the power to intimidate people into silence. It isolates the targets and makes them feel ashamed and responsible. Angry words lead to physical avoidance” (p. 1399). Another interviewee, a lawyer, related that one’s work with others who have been uncivil prompts a greater temptation to retaliate which may then be the beginning of an escalating incivility as demonstrated by Pearson et al. in their research *Assessing and Attacking Workplace Incivility* (2000). They illustrated that an individual who is a target of incivility may retaliate intentionally with a counter-uncivil behavior. This was explained to lead to a chain reaction that escalates into a behavior with more aggression and coercion such as bullying. Clark (2008) compares incivility with dance. If, in dance, one leads and the other follows and then both lead and follow interchangeably in a spontaneous manner, incivility occurs in a similar way, with one initially instigating, the other being the target, and then later on the target follows through with a counter-incivility becoming now the instigator towards the target who initially was the instigator.

This exchange of roles between the instigator and target becomes spontaneous and thoughtless. Andersson and Pearson in 1999 named this phenomenon incivility spiral (Penney & Spector, 2005). Further, a study by Spitzmuller, Glenn, Barr, Rogelberg, and Daniel (2006) on organizational citizenship behavior reveals that the expressive behavior “If you treat me right, I reciprocate,” is definitely a factual experience among workers.

Incivility, believed to be a kind of psychological harassment and emotional aggression that violates the ideal workplace norm of mutual respect (Felblinger, 2008), is inclusive of “rude and discourteous behavior, displaying a lack of regard for others” (as cited in 2008, p. 235). While uncivil behaviors in the workplace like gossiping and spreading rumors harm a coworker’s reputation, name-calling and discounting input from others at any organizational level result in negative affective states on the person, their measure on their impact psychologically and emotionally on a worker is less clear than that of bullying. Incivility and bullying may differ in that sense, but they are believed to be closely associated with each other.

Cases of incivility/bullying/harassment. Jodie Zebell was at the center of the news when she committed suicide in 2008 after months of being a victim of workplace bullying (Hall, 2010). She was looked up as a model employee at the clinic where she worked part-time as a mammographer. Her boss joined in the bullying that started from her coworkers after she was promoted, by filling her personnel file with unwarranted complaints. Zebell also experienced being criticized loudly in front of other people. She was 31 years old and married with two children. Hall additionally cited other cases of bullying in the workplace. Spanish teacher, Susan Steide, also once a marathon runner, related that, for four years, she was left out by older colleagues in her school. As a result of the maltreatment by her coworkers, she suffered from clinical depression, chest pain, and panic attacks and showed symptoms of posttraumatic stress disorder. To cope, she quit teaching in 2009. Another employee who refused to be named said that her boss bullied her by spreading rumors about her and forced her to transfer to an office with no telephone and isolated her from her coworkers. She learned that the boss found another worker to bully when she filed a six-month stress leave.

To address the problem of workplace bullying, several states in the United States are considering the Healthy Workplace Bill to protect employees from bullying (Namie, 2010). Some countries in the European Union, the Scandinavian nations, Britain, and Canada have had antibullying laws in place

since 1994 and early 2000s. In Victoria, Australia, an antibullying law, called Brodie's Law, has been passed. The law states that employers have a responsibility to provide safe working environments where bullying does not happen ("New Victorian antibullying laws welcome but employers cannot shirk responsibility," 2011). At present, the Victorian government is studying tougher punishments to bullies including a jail sentence of up to 10 years. The law also extends to cyberbullying and bullying in the schoolyards.

The law is named after Brodie Panlock who, in 2006, jumped from a building and killed herself after being bullied physically and emotionally by four coworkers in a café in Hawthorne, Victoria. After 5 years from her death, on June 1, 2011, Brodie's Law was passed (Butcher, 2011).

Bullying and incivility. Bullying has been found to be the overt aggressive behavior counterpart of incivility that is oftentimes viewed as "less intent and less transparent in intent but more prevalent in organizations" (Liu, Chi, Friedman, & Tsai, 2009, p. 164). Specifically, "workplace bullying is a form of aggression at work" (as cited in Feblinger, 2008, p. 236). It is known to be a more intentional and repetitive behavior in interpersonal situations that has harmful effects to the health and wellbeing of a person, while incivility is defined as relatively mild, rude, and discourteous behavior (Penney & Spector, 2005). Workplace incivility refers to low intensity deviant behavior possessing an ambiguous intent to injure the target, violating norms of mutual respect in the workplace.

While Feblinger (2008) claimed that the relationship between incivility and bullying, incivility as a precursor of bullying, remains to be empirically investigated, Penney et al. (2005) analyzed that workplace incivility has much in similarity with employee abuse, bullying or mobbing, social undermining, and interpersonal conflict. Research has indicated that the psychological and emotional implications incivility has on a person and organization are found to be in common with those that bullying has. Maybe the time lag between that of incivility and bullying in terms of the appearance of a concrete evidence of those implications on a person and organization is different. In the long run, the impact they have becomes the same. Much so, there has been strong empirical evidence that uncivil behaviors, when not addressed, escalate into bullying behaviors. Hence, addressing workplace incivility is necessary in the prevention of workplace bullying. This, as an organizational management strategy, is actually easier, smoother, and less costly than when interventions only happen after bullying has already emerged when people have become more damaged and the organization has started to suffer from indifferent employees. For instance, when

supervisors are uncivil and cynics, they facilitate job dissatisfaction and low commitment among staff nurses and predict turnover intent. Individuals who have been targets of incivility suffer from physical changes such as headaches, eating disorders, depression, and suicide, which consequentially influence the affective commitment of an employee to an organization (Smith, Andrusyszyn, & Laschinger, 2010). "Incivility can make the workplace unpleasant, and it can be bad for business. Relationships at work that are strained by uncivil encounters can make cooperation and collaboration more difficult to achieve" reiterates Pearson et al. (2001, p. 1403). Employee wellbeing was found to decline with the presence of experienced incivility in the workplace (Lim & Cortina, 2005). Leiter and Stright (2009) explained that the daily rude, demeaning, and neglecting behavior of incivility seems to be a primary cause for people to feel distasteful of and dislike their jobs especially that the violations of basic rules of kindness and respect are pervasive in the organization.

The link among burnout, incivility, and work performance. A study by Laschinger, Leiter, Day, and Gilin (2009) demonstrated the relationships among workplace empowerment, incivility, and burnout and their impact on recruitment and retention outcomes among staff nurses. The study cited literature on similar studies. Pearson and Porath in 2005 determined that workers who experienced incivility intentionally reduced their efforts and quality of work, leading to a diminished overall effectiveness. Cortina et al.'s 2001 study was also cited explaining that there is a link between workplace incivility and decreased job performance and job dissatisfaction. The study further cited the researches of Lim et al. in 2008 that showed significant relationships between incivility and employee health and wellbeing and turnover intentions and those of Dion in 2008 that determined a significant relationship between perceptions of workplace incivility and feelings of support from supervisors. Workplace incivility was further found to be positively related to occupational stress and turnover intentions.

Laschinger et al. (2009) concluded that, when nurses work in environments that empower them to practice according to professional standards and without experiences of uncivil behaviors from supervisors and colleagues, they have very low risks of burning out and high chances of retention in their work settings. Workplace incivility was found to be related to health professionals' experiences of burnout and salient factors for retention. Particularly, supervisor incivility and burnout were important indicators of turnover intentions. Given these findings, the study emphasized that there is a need to ensure professional

practice environments in order to facilitate high quality supervisory and collegial working relationships. In this way, it can be certain that highly skilled nurses remain engaged in their work, and sufficient resources are available “for high quality patient care in today’s chaotic health care settings” (p. 309).

Given the evidence thus far mentioned, it is clear that incivility most often has adverse effects on the employees and organization. Some studies have indicated that burnout has adverse effects on work performance. Other studies show the association between burnout and incivility. Still, other studies demonstrate a positive link between incivility and work performance. While it is also known that burnout among employees has adverse effects on their work performance, it is yet to be clearly and empirically seen what role incivility has on the experiences of burnout among employees and further on their work performance. Specifically, it is hypothesized that incivility may play a facilitating role in the relationship between burnout and work performance; incivility appearing or disappearing at some point in the experience of burnout towards trying to meet a level of work performance. These variables are studied in the context of employees in an academic institution who have an important influence on the education of the young generation. A study by Croom and Moore (2003) emphasized that a more emotionally fatigued teacher has a performance that is likely to suffer. Importantly, as Luparell (2011) concluded, in her article entitled *Incivility in Nursing: The Connection Between Academia and Clinical Settings*, “we stand little chance of breaking the chain of workplace incivility if we communicate to the next generation of nurses that this type of behavior is accepted as a part of our profession” (p. 95). Therefore, it is important, as facilitators of learning and givers of opportunities for human growth, that academic institutions take great attention in shaping and developing civility among students and other clientele to encourage the creation of a supportive community at present and in the future.

## METHOD

The research project employed a mixed-method design. Study 1 was a sample survey of faculty and staff of Silliman University measuring their workplace incivility, burnout states, and work performance ratings. It is a longitudinal study measuring these variables in the sample at the beginning of the semester, middle of the semester, and end of the semester. The sample comprised of 166 faculty and staff of Silliman University.

The Workplace Incivility Scale (WIS) was used to measure incivility. The Maslach Burnout Inventory—Educators Survey (MBI-ES) was used to measure job burnout for employees working in an educational system, and the school's evaluation tool for faculty and staff was used to measure work performance. Correlational and comparative statistical procedures were used to analyze the data collected.

Study 2 was qualitative interviews of 15 Silliman University faculty and staff. Respondents were asked questions relating to what uncivil behaviors they experienced in the workplace and how often these specific behaviors happened and acted by whom. They were also asked what kinds of feelings they had on their experiences of incivility and how they responded to such behaviors. The Scanlan Collaborative Interview Method was used for the interview procedure and data analysis.

## RESULTS

### Study 1

The results of Study 1 have already been initially published in a discussion on the authors' research challenges (Valbuena, 2013). In a brief review of them, the following table illustrates their scores on incivility and burnout.

Incivility was measured as experienced (WIS) and instigated (IWI).

**Table 1.** Scores on Incivility, N = 166.

| Respondents              | Experienced Incivility | Instigated Incivility |
|--------------------------|------------------------|-----------------------|
| <b>Phase 1 (n1 = 81)</b> |                        |                       |
| Faculty                  | 1.14                   | 1.09                  |
| Staff                    | 1.33                   | 1.17                  |
| <b>Phase 2 (n2 = 8)</b>  |                        |                       |
| Faculty                  | 1.41                   | 1.32                  |
| Staff                    | 1.36                   | 1.23                  |
| <b>Phase 3 (n3 = 27)</b> |                        |                       |
| Faculty                  | 1.57                   | 1.26                  |
| Staff                    | 1.38                   | 1.22                  |



| Overall (N = 166) |      |      |
|-------------------|------|------|
| Phase 1           | 1.24 | 1.13 |
| Phase 2           | 1.39 | 1.28 |
| Phase 3           | 1.51 | 1.24 |

Incivility was measured in a scale of 1–4; 1 as very low levels of incivility and 4 as very high levels of incivility. Faculty and staff were independently measured at three periods in the semester: phase 1 was beginning of the semester, phase 2 was middle of the semester, and phase 3 was end of the semester, in order to see their experiences of incivility across periods that entail different kinds and levels of work challenges. All faculty and staff experienced low levels of incivility across the three periods.

Burnout was measured on three dimensions: emotional exhaustion, depersonalization, and personal accomplishment. High levels of emotional exhaustion and depersonalization and low levels of personal accomplishment indicate burnout.

**Table 2.** Scores on Burnout, N = 166 (nfaculty = 93 and nstaff = 73).

|                         | Rating   | f  | %    |
|-------------------------|----------|----|------|
| <b>FACULTY</b>          |          |    |      |
| Emotional Exhaustion    | Low      | 64 | 68.8 |
|                         | Moderate | 21 | 22.6 |
|                         | High     | 8  | 8.6  |
| Depersonalization       | Low      | 84 | 90.3 |
|                         | Moderate | 8  | 8.6  |
|                         | High     | 1  | 1.1  |
| Personal Accomplishment | Low      | 56 | 60.2 |
|                         | Moderate | 17 | 18.3 |
|                         | High     | 20 | 21.5 |
| <b>STAFF</b>            |          |    |      |
| Emotional Exhaustion    | Low      | 55 | 75.3 |
|                         | Moderate | 10 | 13.7 |
|                         | High     | 8  | 11   |
| Depersonalization       | Low      | 54 | 74   |
|                         | Moderate | 16 | 21.9 |
|                         | High     | 3  | 4.1  |

|                         |          |    |      |
|-------------------------|----------|----|------|
| Personal Accomplishment | Low      | 14 | 19.2 |
|                         | Moderate | 30 | 41.1 |
|                         | High     | 29 | 39.7 |

While the faculty experienced low levels of emotional exhaustion and depersonalization as measures of work burnout, they also reported low levels of personal accomplishment as a third measure of work burnout. The staff on the other hand experienced low levels of emotional exhaustion and depersonalization and moderate-to-high levels of personal accomplishment. More particularly, Table 2 shows the participants' scores across the three periods in the semester.

**Table 2.** Scores on burnout across the three periods in a semester, N = 166 (nfaculty = 93 and nstaff = 73).

|                | Emotional Exhaustion |     |     |       | Depersonalization |     |     |       | Personal Accomplishment |     |     |       |
|----------------|----------------------|-----|-----|-------|-------------------|-----|-----|-------|-------------------------|-----|-----|-------|
|                | High                 | Mod | Low | Total | High              | Mod | Low | Total | High                    | Mod | Low | Total |
| <b>Phase 1</b> |                      |     |     |       |                   |     |     |       |                         |     |     |       |
| Faculty        | 4                    | 8   | 29  | 41    | 0                 | 1   | 40  | 41    | 11                      | 5   | 25  | 41    |
| Staff          | 7                    | 8   | 25  | 40    | 2                 | 12  | 26  | 40    | 15                      | 16  | 9   | 40    |
| <b>Total</b>   | 11                   | 16  | 54  | 81    | 2                 | 13  | 66  | 81    | 26                      | 21  | 34  | 81    |
| <b>Phase 2</b> |                      |     |     |       |                   |     |     |       |                         |     |     |       |
| Faculty        | 2                    | 5   | 25  | 32    | 1                 | 2   | 29  | 32    | 5                       | 9   | 18  | 32    |
| Staff          | 1                    | 1   | 24  | 26    | 0                 | 3   | 23  | 26    | 10                      | 12  | 4   | 26    |
| <b>Total</b>   | 3                    | 6   | 49  | 58    | 1                 | 5   | 52  | 58    | 15                      | 21  | 22  | 58    |
| <b>Phase 3</b> |                      |     |     |       |                   |     |     |       |                         |     |     |       |
| Faculty        | 2                    | 8   | 10  | 20    | 0                 | 5   | 15  | 20    | 4                       | 3   | 13  | 20    |
| Staff          | 0                    | 1   | 6   | 7     | 1                 | 1   | 5   | 7     | 4                       | 2   | 1   | 7     |
| <b>Total</b>   | 2                    | 9   | 16  | 27    | 1                 | 6   | 20  | 27    | 8                       | 5   | 14  | 27    |

## Burnout, Work Performance, and Incivility

Generally, burnout and experienced incivility by faculty and staff have been found to be significantly associated in the dimension of emotional exhaustion ( $r = .159, p > 0.05$ ) and depersonalization ( $r = .276, p > 0.05$ ). Burnout was also found to be significantly associated with experienced incivility in the dimension of depersonalization ( $r = .270, p > 0.05$ ). Specifically, among faculty members, experienced and instigated incivility was not found to be significantly associated with burnout. On the other hand, experienced and instigated incivility by staff members was found to be significantly associated with depersonalization ( $r = .460, p > 0.05$  and  $r = .453, p > 0.05$ , respectively).

Looking into the experiences of faculty and staff across the three periods, their experiences of incivility at the beginning of the semester were found to be significantly associated with emotional exhaustion ( $r = .290$ ,  $p > 0.05$  and  $r = .273$ ,  $p > 0.05$ , respectively), and depersonalization ( $r = .447$ ,  $p > 0.05$  and  $r = .437$ ,  $p > 0.05$ , respectively).

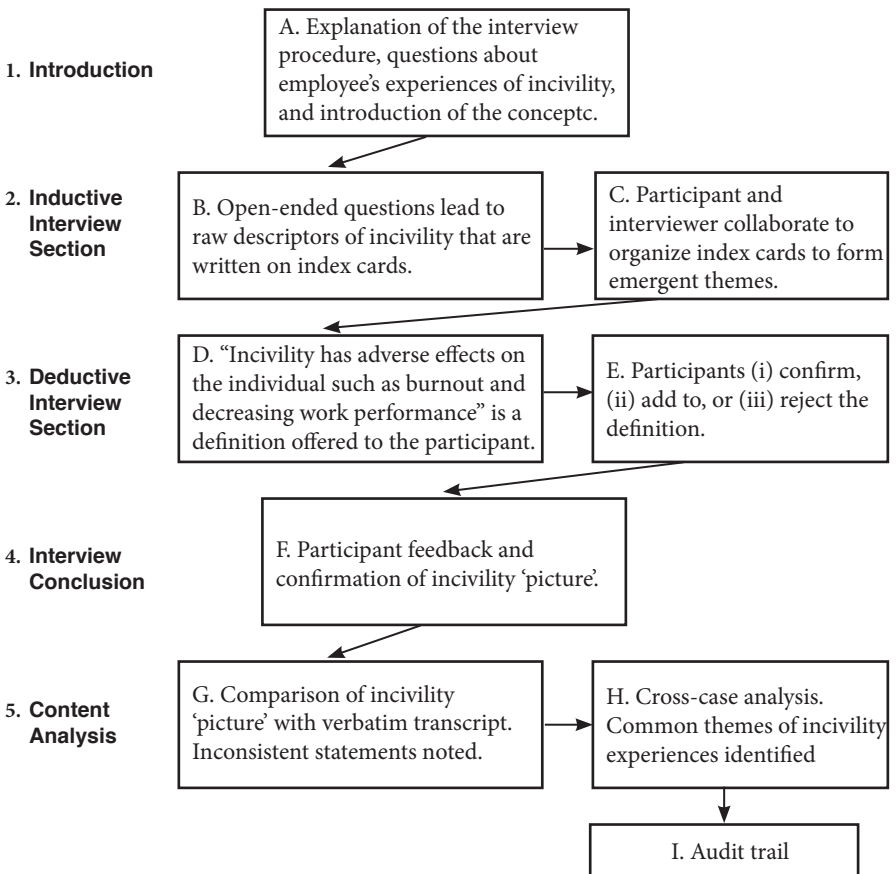
Personal Accomplishment (PA). Given that there was a significant difference between faculty and staff on their PA ( $t = 3.10$ ,  $p > 0.05$ ) and staff having higher PA than the faculty members, it was inferred that the reason why the staff members are higher on their PA as a dimension of burnout compared with faculty members was most likely because their nature of work did not change all year round, whereas the faculty members' work seems to change as per term or period in the semester from starting class activities for the course curriculum to giving exams and making grades. The promotion scheme for staff members is different from that for faculty members. Productivity among staff members is primarily measured in their years of service, seminars attended, and performance appraisal ratings. Although years of service and performance appraisal ratings contribute to points for productivity among faculty members, it is primarily measured through the research projects they make and publications they are able to do. Seminars attended by faculty members do not count towards their promotion. Also, it is the presentation of research papers or being resource persons in seminars/conferences that is given value for promotion. Mere attendance in seminars does not count towards promotion. Because not majority of the faculty members do research, their measured productivity is then low, promotion is very slow, and therefore personal accomplishment is low.

Work Performance. There were only 40 faculty members who had work performance ratings from the Office of Instruction. The lowest rating was 4.33 (good) and the highest rating was 5.0 (excellent). Work performance was rated from 1 (poor) to 5 (excellent). Work performance ratings of staff were not given by the Human Resource Department because of administrative concerns. No correlations were found between burnout and work performance and incivility and work performance.

Incivility. Valbuena (2013) indicated that all participants scored low on both experienced (WIS) and instigated (IWI) incivility scales. It was thought "that employees could have adapted well to incivility in the workplace they have come to look at it as only a natural occurrence and so not seen as largely uncivil" (p. 182). The data from the qualitative interviews in Study 2 gives a better understanding of this experience.

## Study 2

The second study undertaken explored on the employees' personal understanding of incivility. The Scanlan Collaborative Interview Method (Figure 1) was a bit modified for this particular study. Instead of doing a "member check within 10 days" after "comparison with incivility 'picture' with verbatim transcript" and before "cross-case analysis where common themes of incivility experiences identified," that step has already been deleted. The researchers believed that it might be difficult to set another appointment with the interviewees given their initial hesitance for the interview because of the sensitivity of the topic.



**Figure 1.** The Scanlan Collaborative Interview Method used for the gathering and analysis of qualitative data on incivility.

The questions asked were the following:

1. Having heard the definition of incivility, can you think back over your career and remember a time you felt that someone in your workplace particularly was uncivil to you? Tell me about that experience, what was that like to you?
2. Can you recall any of the feelings associated with that experience?
3. Can you recall any emotions surrounding that experience?
4. Can you recall any consistent thoughts you had during that experience?
5. How do you feel about your supervisors/superiors? How do you feel about your colleagues?
6. How do you feel about your work overall?
7. How do you feel mentally? Physically?
8. Were there any thoughts, feelings, or emotions that you had during this experience?
9. How did this experience last?

Fifteen faculty and staff were interviewed. The average interview time was 25 to 45 minutes.

## **UNDERSTANDING OF INCIVILITY**

The answers to the questions were categorized into a) what to them is incivility, b) what they know are uncivil behaviors, c) feelings that were associated with incivility, d) thoughts that were associated with incivility, e) how they responded, and f) how it affected their work performance.

The 15 interviewees generally did not exactly know what incivility was. Many of them started their description of it from the word “civil” (which they said they assumed to be the root word) and what they know of “civil”.

The interviewees’ descriptions of incivility were the following: unethical, emotional aggression, rudeness, cruelty, insubordination, disobedience, unfriendliness, disrespect, betrayal, discord, tension, disagreement, betrayal name-calling, unfairness, injustice, defiance, and psychological harassment. They further reported that intentionally making your work difficult, making comments that are inappropriate, when people manipulate, not conforming to prescribed order or rules, questioning credibility, unsupportive of others or crab mentality, backstabbing, gossiping, and unrecognizing work are indicators of incivility. One particularly said that incivility is normal in an organization of leadership.

Uncivil behaviors. The interviewees enumerated the following as examples of what they understood were uncivil behaviors: shouting and saying bad comments in front of people, hitting the table, not asking permission on the use of personal things of coworker, accusing you of things you did not do, making black propaganda, red tape, not paying attention to requests by students and colleagues (people who are not friends with you do not prioritize your requests/showing favoritism), and when your rights are not respected.

Thoughts and feelings. When asked what their thoughts were when they were experiencing incivility, they said that they thought that instigators come from different family orientations and so behave differently, they have to continue to be professional despite others being uncivil to them (“I have to think about my students”), they have to do right despite the displeasing feelings, and they take it as part of their work. One interviewee is quoted by saying against her instigator, “She does not know me.” Another one thought, “Bahala na sila” (I let them be). Another further mentioned he only kept telling himself, “I need to settle this with him.” Other thoughts were “Being civil is a responsibility”, “I think about the positive characteristics of the person to help me survive”, and “Vindication is not mine. It’s the Lord’s. I just pray every day that I should be a blessing to others”.

When experiencing incivility, they reported feeling angry and hateful, dismay and disgust, hurt and half-heartedness or apathy, frustration, and betrayal. They further expressed feeling displaced from where they believed they rightfully belong, got emotionally exhausted, felt belittled, and resented their supervisor when they are not trusted. One interviewee said that she kept herself positive and accepting of people, but it came to a point that she wanted to shout, “Tama na!” (Enough!).

Responsive behaviors. Interviewees indicated that telling the person personally but in a casual way, changing one’s thinking, finding someone to discuss the experience with, forcing oneself to continue being professional, and working hard at trying to prove oneself were reported as behaviors they engaged in when they experience incivility from others. In very angry situations, interviewees indicated that they walked away, detached oneself from the situation, wrote an anonymous letter, became uncivil too saying harsh words, and developed a strong desire to get out of the system because she could not take it anymore. She did not only experience incivility. The behavior by her coworkers escalated to bullying. One interviewee emphasized, “Ako gyung kitkiton kung hilabtan ko kay dili ra ba ko manghilabot” (I will bite that person to bits if anyone dared to attack me because I do not ever attack anyone first).

Impact on the person. When asked how experiencing incivility affected their work performance, interviewees reported that they felt demotivated and disheartened, have become uncivil themselves towards others, lost the desire to go to the office, did not anymore put value in university activities, and felt burnt-out because of the loss of interest at work. One said that experiencing incivility did not adversely affect her teaching but she no longer participated in university activities to avoid being criticized all the time. Another mentioned that he felt being pulled down or unsupported by colleagues when they saw that his students liked him. While one developed hatred, another became combative.

Incivility vs bullying. From 15 interviews done among faculty and staff, data indicated that most of the interviewees either did not know what incivility was or were not sure if it was similar to bullying. When asked what they think about the differences between bullying and incivility, most of them looked at both of them as similar to each other. Others indicated that bullying was a kind of incivility. Further, others understood incivility as intentional injury to others while bullying was unintentional. One said that incivility was gossiping and name-calling while bullying could be “playful bullying and teasing each other”. Two of the interviewees had a good understanding of the two by saying that incivility was name-calling, being inconsiderate of others, and being tactless while bullying was emotional outbursts and a behavior that degrades others.

## DISCUSSION

Data in Study 2 did not follow through from Study 1. As results in Study 1 indicated that faculty and staff did not generally experience uncivil behaviors, data in Study 2 showed that not only did faculty and staff experienced incivility but also bullying. The qualitative responses in Study 2, in some ways, may have confirmed that participants did not experience uncivil behaviors, but it must be known that there existed a gap between what the participants understood as incivility and civility. They did not know they were experiencing uncivil behaviors. The uncivil behaviors they were asked about in Study 1 could have been behaviors that participants viewed as normal occurrences in the workplace because the behaviors they indicated in the qualitative interviews as uncivil were actually bullying behaviors already.

Many of them described uncivil behaviors as shouting rude comments in front of people, hitting the table, making black propaganda, and violation of one's rights. Others described it as red tape, disobedience to organizational rules

or insubordination, not conforming to social norms, and name-calling. Very few understood that uncivil behaviors included not asking permission when personal things were used by coworkers, gossiping, indirectly making one's work difficult and unrecognized/unappreciated work, and engaging in unethical, rude, and cruel behavior. There is a very poor knowledge about what incivility is. Just like "texting while in a meeting" may be found as uncivil, there are others who are not affected by it and will find it okay. However, research has indicated that incivility in general may have an adverse impact on the organization in the long run. Porath (2018) said, "Small uncivil actions can lead to much bigger problems like aggression and violence". In Porath's research, she found that incivility caused people to be less motivated. Specifically, 80% of employees lost work time because they spent so much time worrying about their experience, 66% cut back on their work efforts, and 12% left their job (2018). With that research finding, CISCO reported that it believed they lost 12 million dollars a year because of incivility experiences in their workplace. In a follow-up research study, Porath (2018) also found that incivility does not just impact the direct recipient but also affect the performances of the witnesses or bystanders. Their work performances declined by 25%. Porath concluded that "Incivility is like a bug. It is contagious. We become carriers of it just by being around it" (2018).

The emotional experiences of anger, hate, hurt, betrayal, displacement, or degradation when another coworker was being uncivil made participants either engage in similar uncivil behaviors to survive the situation or force themselves to try to think positive of the situation. However, for the latter, they said that, sometimes, it comes to a point that they could not take it anymore, so they similarly engage in uncivil behaviors like using harsh words towards others. For others, they sought others they can talk to about the experience who they think can understand them, did things to prove to others that they are good workers too, or continue to behave professionally. One said that she wanted to get out of the system because she could not take it anymore. This was the employee who actually did not only experience incivility in her workplace. The behavior by her coworkers has actually escalated to bullying.

Incivility has a lot of costs. While Study 1 failed to confirm experiences of incivility by faculty and staff and what its role is in relation to burnout and work performance, Study 2 clearly showed a widespread experience of incivility in the workplace. More concerning is on the reported experiences of bullying of faculty and staff which, when not addressed, may become a much worse problem in the future both on employee wellbeing and organizational success.



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## CONCLUSION

The insufficient knowledge and understanding about incivility in the workplace allow for incivility to continue to occur which has adverse effects on the employees. Because incivility continues to be unaddressed, employees have come to accept them as normal workplace experiences. Unaware about the direct cause of incivility, employees continue to feel less respected, valued, and appreciated at work, which, in turn, affects the way they fulfill their tasks. The organization as a whole becomes less productive. What has become more of a problem is the progression of uncivil behaviors into bullying which has more negative consequences on the wellbeing of individuals and the entire organization.

It is recommended that the quantitative study (Study 1) will be repeated with a more refined, rigorous, and vigorous methodology addressing all the challenges (Valbuena, 2013) encountered in implementing it. It might yield different results.

## ACKNOWLEDGMENT

This research was funded by the Research and Development Center of Silliman University.

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# The State of Mental Health in Negros Oriental: Implications for Psychology Training and Practice

**Margaret Helen U. Alvarez**  
*Research and Development Center  
Silliman University, Dumaguete City, Philippines*

Given the disparity between the numbers of licensed practitioners and those in actual psychology practice, it was deemed important to look at the immediate environment to answer questions pertaining to the state of wellbeing and mental health needs of the province of Negros Oriental. Those interviewed were point persons in the Department of Health and mental health practitioners in the province to provide information on local mental health needs, available resources and professional help, protocols in schools and hospitals for mental health problem referrals, common mental health problems in different contexts, public perception of psychological assessment, and public perception of abnormal psychology. Survey results have important implications for policy planning in local government and curriculum planning in higher education institutions.

**Keywords:** mental health, psychosocial needs, psychology practice, psychologists, psychometricians, psychology practitioners

## BACKGROUND AND RATIONALE

The Philippine Psychology Act of 2009, otherwise known as Republic Act 10029, was signed into law for the purpose of regulating the practice of psychology. The Professional Regulatory Board (PRB) of Psychology then proceeded to issue a professional license for all those who qualified to register as psychometricians and as psychologists without examination

as long as they met requirements pertaining to experience and education credentials. The deadline for making such an application was May 21, 2015. The first board examination for psychologists was on October 26–27, 2014, and the first board examination for psychometricians was on October 28–29, 2014. Very few (less than 30) Silliman alumni took the first boards for psychometricians even though all with a college degree in psychology qualified to take it and all with a master's degree in psychology qualified to take the exam for psychologists.

The law—RA 10029—does not cover teachers in psychology except for those teaching board examination subjects. In addition, despite having a license as a psychometrician (minimum requirement to take the board is a college degree in psychology), the individual will need at least a master's degree in order to teach in the tertiary level.

The question then becomes: What does the psychometrician license and/or the psychologist license give the licensed professional? What jobs are available and what positions should the individual seek? These are relevant questions to ask at this time, after over 10,000 individuals have become licensed psychometricians—with or without examination since the implementation of the law—as well as almost a thousand psychologists. These very questions are also asked of both the PRB of Psychology of the Professional Regulation Commission (PRC) and the Psychological Association of the Philippines (PAP)—the accredited integrated professional organization (or AIPO).

It is important to look at the immediate environment to answer these questions. The mental health needs of the province of Negros Oriental are served primarily through the Philippine Mental Health Association (PMHA) and a few (less than 10) mental health practitioners (i.e., psychiatrists, psychometricians, and psychologists). For many years, psychology has been an attractive major in college, across the four universities in Dumaguete City and especially at Silliman University. There is also a growing number of graduates from Silliman's masters (which started in 1997) and doctoral (given government recognition in 2010) programs in psychology. The disparity between the number of those drawn into this profession and the number of professionals actually practicing in this field is worrisome. The professionalization of the discipline was partly intended to address this problem. Now that we have the professionals, there is a need to understand the landscape.

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## REVIEW OF RELATED LITERATURE

There is no health without mental health. This is what the advocates for a Mental Health Law keep saying (Senate Bill 1354, 2017). A decade ago (WHO & DOH, 2007), the World Health Organization (WHO) along with the Department of Health (DOH) used the Assessment Instrument for Mental Health Systems (AIMS) to look into mental health practice in the Philippines, finding among others, that:

- a) The country had a National Mental Health Policy (Administrative Order #5) signed in 2001;
- b) There was no mental health legislation, and the laws that governed the provision of mental health services were contained in various parts of promulgated laws such as Penal Code, Magna Carta for Disabled Person, Family Code, and the Dangerous Drug Act;
- c) The country spent about 5% of the total health budget on mental health, and substantial portions of it were spent on the operation and maintenance of mental hospitals;
- d) The social insurance scheme covered mental disorders but was limited to acute inpatient care; and
- e) Psychotropic medications were available in the mental health facilities (WHO & DOH, 2007).

When this WHO–DOH assessment was embarked upon, the goal was to collect information in order to “improve the mental health system and to provide a baseline for monitoring the change” so that the country could then develop information-based mental health plans with clear baseline information and targets, implement reform policies, provide community services, and involve users, families, and other stakeholders in mental health promotion, prevention, care, and rehabilitation (WHO & DOH, 2007).

The assessment found that it was the National Program Management Committee (NPMC) of the DOH that acted as the mental health authority. Statistics indicated that 46 outpatient facilities treated 124.3 users per 100,000 population. There were 15 community residential (custodial homecare) facilities that treated 1.09 users per 100,000 general population. Mental hospitals treated 8.97 patients per 100,000 general population, and the occupancy rate was 92%. The majority of patients admitted had a diagnosis of

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schizophrenia. There had been no increase in the number of mental hospital beds in the five years prior to the assessment. All 400 forensic beds were only at the National Center for Mental Health (NCMH) in Mandaluyong, Metro Manila, and more problematically, involuntary admissions and the use of restraints or seclusion were common.

There had been efforts in the mid-1990s made by the National Mental Health Program to integrate mental health services in community settings through the training of municipal health doctors and nurses on the identification and management of specific psychiatric morbidities and psychosocial problems. However, at the time of the WHO–DOH assessment in 2007, majority of the trained community-based health workers were no longer in their place of duty, and the primary health care staff seemed to have inadequate training in mental health.

The Philippine Council for Mental Health was only created in 1998(Executive Order No. 470). The Council's most significant functions were a) to formulate policies and guidelines on mental health issues and concerns and b) to develop a comprehensive and integrated national plan on mental health. At the turn of the century and in comparison with other countries, the Philippines had a national mental health policy, but it was not put in place for some years (Mental Health Atlas WHO, 2005). In April 2001, the Secretary of Health signed the National Mental Health Policy (Administrative Order No. 5, Series 2001)—a document containing generic goals and strategies for the Mental Health Program. In particular, the Policy was to be pursued through a mental health program strategy “prioritizing the promotion of mental health, protection of the rights and freedom of persons with mental diseases, and the reduction of the burden and consequences of mental ill-health, mental and brain disorders, and disabilities.” This was a landmark development, considering that, for almost five decades, the mental health program had largely been “centered on the treatment of those with mental disorders in a mental hospital setting” (Conde, 2004).

From a historical viewpoint, the first known organized care for the mentally ill was established in the late 19th century at the Hospicio de San Jose, for sailors of the Spanish naval fleet (Conde, 2004). The arrival of the Americans in the 1900s led to a more scientific approach in treatment markedly different from the prevailing use of traditional indigenous medicines at that time. In 1904, the first ‘Insane Department’ was opened in a government hospital; in 1918, the City sanitarium was built; and in 1928,

the mentally ill were transferred to the National Psychopathic Hospital in Mandaluyong, where it remains to this day, as the National Center for Mental Health (NCMH). In 1950, a nongovernment civic association, the Philippine Mental Health Association (PMHA), was organized, but its programs, although envisioned to be community-directed, have remained isolated (Conde, 2004).

By 2005, there was community care, but it was rather limited because there was no mental health law. A feature shared among many low- and lower-middle-resource countries is poor involvement of primary health care services in mental health. The number of psychiatrists per 100,000 general population was similar to the majority of countries in the Western Pacific region and about average for lower-middle-resource countries in the world (Mental Health Atlas WHO, 2005).

In 2007, there were 3.47 human resources working in mental health for 100,000 general population (WHO-DOH, 2007). Rates were and continue to be particularly low for social workers and occupational therapists. More than 50% of psychiatrists work in for-profit mental health facilities and private practice. The distribution of human resources for mental health seemed to favor that of mental health facilities in the main city. Family associations (i.e., those that include family and friends of users of mental health facilities) are present in the country but are not involved in implementing policies and plans, and few interact with mental health facilities. Public education and advocacy campaigns were overseen by the DOH and coordinated in the regional offices. Private sector organizations did their share in increasing awareness on the importance of mental health, but they utilized different structures. There were mental health links with other relevant sectors, but there was no legislative or financial support for people with mental disorders.

In the area of mental health research, the WHO-AIMS 2007 study found that 1) nonstandardized data were collected and compiled by facilities to a variable extent, 2) mental health facilities transmitted data to the government health department, 3) studies on nonepidemiological clinical/questionnaires assessments of mental disorders and services had been conducted, but 4) not all mental health studies were published in indexed journals (WHO-DOH, 2007).

The mental health system in the Philippines has different types of mental health facilities; most need to be strengthened and developed. The

few mental hospitals are working beyond their capacity (in terms of number of beds/patient). Access to mental health facilities is uneven across the country, favoring those living in or near the National Capital Region (NCR). There are informal links between the mental health sector and other sectors, and many of the critical links are weak and need to be developed (i.e., links with the welfare, housing, judicial, work provision, education sectors). The mental health program of the DOH, for example, has partnerships only with the Philippine Psychiatric Association (PPA), the NCMH, the PMHA, and Christoffel-Blindenmission (CBM), an international Christian nongovernment development organization specializing in the empowerment and inclusion of people with disabilities (DOH, n.d.).

The Psychological Association of the Philippines (PAP) has no viable agreement with the Department of Health. There is no plantilla in government (not just in DOH) for licensed psychometricians even as there is (and should be) a place in mental health programs for the psychology professional. The availability (or lack) of jobs for psychology practitioners in government mental health programs has major implications for training and curriculum planning in the country's universities.

During the 17th congress of the Republic of the Philippines was filed a senate bill for establishing a national mental health policy for the purpose of enhancing the delivery of integrated mental health services and for promoting and protecting persons utilizing psychiatric, neurologic, and psychosocial health services (Senate Bill 1354, 2017). In lobbying for this bill, Hontiveros (n.d.) cited some mental health problems:

- 1 in 5 people suffer from mental health problems worldwide, yet in the Philippines, there are only 5 psychiatrists per 10 million Filipinos.
- Most health insurance companies still do not cover mental health-related issues, and the stigma still weighs heavily on those suffering from mental illness.
- 25.71% of young people have thought, at least once, that their life was not worth living.
- 14.2% have considered taking their life and engaged in steps to push through with it.

In addition, Hontiveros (n.d.) indicated the five primary priorities of the bill, namely, 1) protection of the rights and welfare of people with

mental health needs, 2) development and implementation of National Mental Health Program, 3) modernization of mental health facilities, 4) strengthened community-led mental health services down to the barangay, and 5) integration of mental health in schools' curricula.

Thus, the bill's declaration of policy says that the State affirms "the basic right of all Filipinos to mental health as well as the fundamental rights of people who require mental health services" and further,

The State commits itself to promoting the wellbeing of its people by ensuring that: mental health is valued, promoted, and protected; mental health conditions are treated and prevented; timely, affordable, high-quality, and culturally-appropriate mental health care is made available to the public; and persons affected by mental health conditions are able to exercise the full range of human rights and participate fully in society and at work, free from stigmatization and discrimination. (SB 1354, 2017)

Pending the approval of this bill, the fact remains that there are growing mental health problems nationwide, there are limited mental health facilities, and many of those already in the field feel inadequate to deal with psychosocial issues brought about by the government's war on drugs and the fallout from natural calamities. As Hechanova and colleagues (2015) have said, "the science of disaster response is quite young especially in the Philippines, and psychological research on disasters is just emerging" (p. 1).

In response to the disaster wrought by Typhoon Yolanda, the Psychological Association of the Philippines (PAP) created in 2013 a Special Interest Group (SIG) for Mental Health and Psychosocial Support (MHPSS) that has since trained mental health practitioners on disaster preparedness, developed modules for training, and sponsored a special issue of the Philippine Journal of Psychology (PJP) on "Disasters and Mental Health" (2015). At the height of the Philippine government's war on drugs, the PAP created a task force on Drug Prevention and Community Support in October 2016 that has since been made into an SIG as well and now named Substance Use Prevention and Recovery SIG. As a task force, it conducted training workshops for mental health professionals and also produced modules for facilitators (PAP, 2017).

Meantime, the Commission on Higher Education (CHED) Technical

Panel for psychology education has agreed upon the policies and standards for undergraduate programs in psychology (CMO No. 34, s.2017). This is the program that qualifies graduates to take the board examination for psychometricians. To date, over 10,000 are licensed—a rich resource to serve in the mental health profession, but it remains largely untapped.

## STATEMENT OF THE PROBLEM

In an attempt to examine the discrepancy between the increased mental health concerns in the country and the large number of licensed practitioners who either do not have jobs or are not working in mental health programs, this study looked into the local setting where 1) four universities produce some 50 or so potential psychology practitioners annually, and 2) those who do get licensed are not employed in mental health centers or facilities. In particular, I explored

1. The mental health needs in the locality—that is, Dumaguete City and surrounding municipalities of Negros Oriental;
2. Available resources and professional help;
3. Protocols in schools for mental health condition referrals;
4. Common mental health problems in different contexts (e.g., hospital, industry, educational settings);
5. Public perception of psychological assessment;
6. Public perception of abnormal psychology;
7. Statistics on the psychology profession (licensure numbers, schools offering psychology, and so on); and
8. HEI response to the professionalization of psychology.

## METHOD

The research environment is primarily Dumaguete City—capital city of the province of Negros Oriental in Central Philippines. There are four universities (three private and one public), namely, Foundation University (FU), Silliman University (SU), St. Paul University of Dumaguete (SPUD), and Negros Oriental State University (NORSU). All but one (FU) offers an undergraduate psychology program with only two (SU and NORSU) having graduate programs in psychology. Silliman University has a medical

school, but its medical center does not have an accredited psychiatry training program. The Negros Oriental Provincial Hospital (housing the DOH regional office during the brief period when the province was part of the Negros Island Region) has a psychiatric ward located in Talay, Negros Oriental. The Philippine Mental Health Association is provided with an office in Dumaguete City by the local government.

To collect the data, interviews were made of key persons—1) mental health professionals in the province (e.g., DOH officials, psychiatrists, psychologists, psychometricians, and social workers), 2) school psychologists or guidance counselors, and 3) HR practitioners.

## RESULTS AND DISCUSSION

Based on an interview with the city health officer in Dumaguete, there is no clear mental health policy, and the Department of Health has very limited budget for mental health concerns. She welcomed, in fact, any form of research on mental health in the province so that they could lobby for a better program, but at the time of the interview, the DOH office was going through an “identity crisis” because there was no final decision as yet about the establishment of the Negros Island Region (NIR). This move would have both budgetary and accessibility implications.

A subsequent interview with the lone (at the time) psychiatrist for the province also revealed that the province’s psychiatric ward, located about a kilometer southwest of the provincial hospital, caters not only to the mental health needs of the province but also to neighboring Siquijor Island and even parts of Mindanao and Negros Occidental (Personal communication, Glenda Basubas, August 19, 2016). Many of the clients are brought to the provincial hospital by relatives, but sometimes, the psychiatry staff has to go to the towns or municipalities to transport referrals from district hospitals or health centers to the provincial hospital. Only the provincial hospital has a psychiatric ward.

Records of the psychiatric ward (Table 1) reveal that the number of mental health cases increases steadily every year. In 2010 alone, the NOPH Psychiatric Ward served 1001 out-patients from Negros Oriental, the number rising annually by as much as 30%. Once someone goes to the ward, the patient is in the records forever because “there is no cure for schizophrenia.” The Ward also serves the province of Siquijor with some 60 or so patients

coming in increasingly every year, the province of Cebu, and other provinces (e.g., Negros Occidental, Zamboanga del Norte, even Pampanga).

Capital city Dumaguete is central, but many municipalities are some seven hours away via all manner of transportation. Negros Oriental Provincial Hospital (serving psychiatric patients for the province) does not have a regular psychiatrist. The in-patient facility (psychiatric ward) has a capacity of 25, but currently, there are 80 patients, a few of whom have families living at the facility. One patient has been at the facility over 30 years. Patients (including out-patients) are provided medications and room and board for free, but the budget frequently runs out and the facility relies heavily on donations. Existing personnel (registered psychologist,  $n = 1$ ; registered psychometrician,  $n = 1$ ) registered without examination (by virtue of the grandfather clause) and feels inadequate in their training, thus, they are not empowered to take initiatives and to provide psychological services. The staff is provided by the city, but the budget is from the province. According to the facility's action manager, they have a Board of Management that receives its mandate from the provincial governor (Personal Communication, Aurora Flores, August 19, 2016), but even at this late date, the 2016 provincial budget had not yet been approved.

There is no psychological testing upon admission and no subsequent psychological counseling, psychotherapy, or any other psychological intervention (Pers. Comm., Sherwyn Arbas, August 19, 2016). The one psychiatrist at NOPH is from Cebu City; she is in Dumaguete every Friday, at which time, out-patients come in for physical check-up and are given their medications; there is no time for psychotherapy. If someone is referred to NOPH when the psychiatrist is not in town, they are asked to return on Friday for a diagnosis. The psychiatrist also comes into town more often or earlier than Friday if she has court hearings.

Psychological testing, if any, is done if there is a court order (as in the case of inmates/detainees). The testing is done by a licensed psychometrician (RPM) provided by the PMHA. The RPM administers projective techniques, interprets projective data, and signs psychological reports, even though this is against RA 10029. The prevailing climate is one of pessimism and helpless passivity; there is no initiative that comes from the staff themselves. The thinking is that, once a person is diagnosed with schizophrenia—the most common diagnosis in the province (undifferentiated type)—one is medicated for life. Individuals are brought in routinely (for medications)

because families are fearful of violence and do not know how to manage a person with a mental disorder. The prevailing beliefs include heritability, schizophrenia caused by diseases such as typhoid (“typhoid schizophrenia” is a common diagnosis), and the incurability of schizophrenia.

There are at least six practicing psychiatrists in Dumaguete—two come to Dumaguete once a week (they have a full-time practice in Cebu City), two are semiretired, and one is frequently unavailable in the city because he sees patients in other towns and municipalities provincewide. There are at least two private psychology clinics in Dumaguete; one caters primarily to psychological evaluation for DepEd teachers, cases of adoption, employment, and so on. The other takes up the slack—providing psychological evaluation to go with police reports and annulment cases and psychotherapy. Majority of clients come in for psychotherapy for depression; there are also those in need of couples counseling. There are at least eight registered psychologists but only four have a clinical background; there are between 15–25 registered psychometricians, about a third in the academe, less than a third working in clinical contexts, and the rest are employed in industry (but not doing psychometrician work).

Some 600 persons dependent on drugs have surrendered to the PNP. The city health office has put them on hold (recorded and sent home) because there are no facilities for them and no psychological intervention programs. More are expected. The plan is to send them to the drug rehabilitation facility in Argao, Cebu, but the place is filled.

Interviews with key persons revealed that referrals to psychology clinics usually come from a) the educational setting—e.g., teachers, guidance counselors, and dormitory managers; b) nongovernment organizations (NGOs) such as GWAVE (Gender Watch against Violence and Exploitation) and orphanages; c) government agencies, notably the Department of Social Welfare and Development (DSWD); d) the industrial setting (notably from HR practitioners at BPOs; e) lawyers; f) medical practitioners, notably neurologists, psychiatrists, and others; and g) the women’s and children’s desk of the Philippine National Police. Parents also bring their children or themselves for therapy.

Referral reasons from the education setting have usually had to do with suicide ideation or suicide attempts. Many young people make appointments with psychologists because of anxiety, panic attacks, depression, uncertainty about their direction in life, and a general aimlessness, regardless of whether



or not they are doing all right in school. The NGOs, the PNP, and the DSWD frequently refer for legal reasons—i.e., a psychological evaluation report is a required document when there is a case of domestic violence or child abuse, in cases of adoption, and annulment as well as cases involving an individual's cognitive capacity or competence. Referrals from the industrial setting frequently come from the HR manager, at times because their employee wishes to resign or has mental health issues.

## CONCLUSIONS AND RECOMMENDATIONS

Pending the signing of the Mental Health Act into Law, the state of mental health in the province of Negros Oriental is dire. There are limited numbers of mental health facilities and mental health practitioners; schools are providing psychology training, but the licensed graduates cannot be found working in mental health programs.

It is highly recommended that the psychology discipline reviews, reestablishes, retools, and replicates. First, it is necessary to review the psychology curriculum. The undergraduate psychology curriculum trains the student to pass the board examination for psychometricians. In the Psychology Law of 2009, psychometricians are authorized to do any of the following activities:

1. Administer and score objective and structured personality tests,
2. Interpret results of these tests and prepare a written report on the results, and
3. Conduct preparatory intake interviews for clients for psychological intervention sessions.

Although these activities can only be conducted under the supervision of a licensed psychologist and the written reports prepared by the psychometrician should bear the name of the supervising psychologist, it is clear that there is a place for psychometricians in the mental health profession; psychometricians receive adequate training and education to work at mental health facilities and provide services for them. What should more importantly be reviewed are the policies of the Department of Health and the Civil Service Commission so that there is a provision for psychometricians in public service.

Hence, there is a need to reestablish relationships between the accredited

psychological organization (of which all licensed professionals must be members) and the sectors it serves—e.g., Department of Health, Department of Social Welfare and Development, nongovernment organizations, and private medical facilities and clinics.

Given that 896 psychologists and 2313 psychometricians were, by virtue of their academic degrees and years of experience, licensed without examination, retooling becomes an important personal and professional endeavor. Many of those who had been in practice for some time did not (for various reasons) qualify for the license whereas others, probably less experienced, did. The latter need to update themselves and train in current trends in psychology practice and ethical responsibilities.

Finally, if this is the state of mental health in the province of Negros Oriental, it is recommended that a similar study be done in other provinces, even if only in the Visayas, thus, replicating and preparing each region for the implementation of the Mental Health bill when it is signed into law.

## **ACKNOWLEDGMENTS**

This study was funded as a Professorial Chair grant from the United Board of Higher Education in Asia.

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**Table 1.** Number of new cases from 2013–2015 at the Psychiatric Ward, Negros Oriental Provincial Hospital.

| CITY/MUNICIPALITY | YEAR |                |      |      |      |
|-------------------|------|----------------|------|------|------|
|                   | 2010 |                | 2013 | 2014 | 2015 |
|                   | OPD  | NEW CASES (NC) | NC   | NC   | NC   |
| Dumaguete         | 204  | 23             | 49   | 58   | 66   |
| Bayawan           | 83   | 25             | 27   | 33   | 24   |
| Bais              | 77   | 14             | 39   | 32   | 32   |
| Siaton            | 74   | 18             | 23   | 22   | 13   |
| Bacong            | 56   | 8              | 11   | 11   | 14   |
| Mabinay           | 54   | 13             | 18   | 15   | 20   |
| Sibulan           | 47   | 12             | 11   | 14   | 14   |
| Santa Catalina    | 46   | 12             | 8    | 8    | 9    |
| Zamboangita       | 44   | 9              | 6    | 8    | 3    |
| Valencia          | 44   | 9              | 9    | 11   | 18   |
| Dauin             | 36   | 4              | 5    | 9    | 5    |
| Tanjay            | 35   | 6              | 16   | 15   | 14   |
| Ayungon           | 32   | 9              | 14   | 14   | 13   |

|                     |      |    |    |    |   |
|---------------------|------|----|----|----|---|
| <b>Amlan</b>        | 26   | 5  | 8  | 5  | 5 |
| <b>Manjuyod</b>     | 23   | 4  | 8  | 12 | 8 |
| <b>Bindoy</b>       | 23   | 11 | 1  | 5  | 7 |
| <b>San Jose</b>     | 21   | 1  | 2  | 5  | 3 |
| <b>Pamplona</b>     | 20   | 5  | 11 | 7  | 9 |
| <b>Basay</b>        | 19   | 3  | 2  | 2  | 1 |
| <b>Guihulngan</b>   | 17   | 1  | 7  | 7  | 6 |
| <b>Jimalalud</b>    | 7    | 1  | 1  | 5  | 1 |
| <b>Vallehermoso</b> | 4    | 2  | 2  | 1  | 2 |
| <b>Canlaon</b>      | 3    | 2  | 2  | 2  | 3 |
| <b>La Libertad</b>  | 3    | 1  | 3  | 2  | 0 |
| <b>Tayasan</b>      | 3    | 1  | 3  | 7  | 8 |
| <b>Neg. Or.</b>     | 1001 |    |    |    |   |



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# Assessment of the Diversity of Animals in the Forest Ecosystems of Pantabangan–Carranglan Watershed Forest Reserve, Nueva Ecija, Philippines

Annie Melinda Paz-Alberto, Shirley C. Serrano,  
and Daryl A. Juganas

*Institute for Climate Change and Environmental  
Management, Central Luzon State University, Science  
City of Muñoz, Nueva Ecija*

The diversity of animals in the forested area of Pantabangan–Carranglan Watershed Forest Reserve was assessed. The four major groups of animals such as birds, mammals, reptiles, and amphibians were observed, described, identified, and classified. Birds and volant mammals were observed through standard mist netting and either sight or sounds. On the other hand, nonvolant mammals were observed or caught by traps and searching along their possible habitat. Amphibians were caught by hand, and the reptiles were observed through sightings.

A total of 53 animal species were observed in the area under 30 families, where Families Columbidae, Pteropodidae, Muridae, Colubridae, Ceratobatrachidae, and Dicroglossidae were the most represented families. Of the observed animals, 40 species were identified up to species level, and 13 species were identified through sightings and sounds.

A bird species “Sawsaw-it” (*Cinnyris jugularis*) got the highest importance value index of 19.32% and biodiversity indicator value of 17.5%. It was also the most common and the most dominant animal species surveyed in the forest ecosystem. Pantabangan–Carranglan Watershed Forest Reserve exhibited low-to-very low diversity.

Six species were listed as vulnerable and 3 species as near threatened. There were 40 native species recorded. Furthermore, there were no introduced species recorded in Pantabangan–Carranglan Watershed Forest Reserve.

Human activities such as timber poaching, forest fires, soil erosion, kaingin farming, mining, and wildlife hunting posed small-to-moderate impacts on the area.

**Keywords:** Fauna, Biodiversity, Forest Ecosystem, Pantabangan–

Carranglan Watershed Forest Reserve, IUCN Red List of Threatened  
Species

## INTRODUCTION

**B**iodiversity as defined in the United Nations Convention on Biological Diversity (UNCBD) is “the variability among living organisms from all sources including, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part.” Biodiversity consists of a variety of species, their genetic make-up, and the communities or population to which they belong (MEA, 2011).

The Philippines’ terrestrial and marine habitats contain some of the richest flora and fauna, and its waters are considered a part of the Biodiversity-Coral Triangle. Further, many of these organisms are endemic to the Philippines. Of the 580 recorded birds, more than 35% can only be found in the Philippines. More than 60% of the 167 different species of mammals and 65% of more than 10,000 species of plants are endemic (Lee, 2010).

Animals are excellent indicators of the change in the biosphere. They are sensitive to the quality of atmosphere and habitat in which they live, and they play important roles in traditional culture, folklore, study and research, pharmaceuticals, pest control agents, and important food source for some cultures (The Global Amphibian Campaign, 1999).

This project aimed to determine the exploitation and conservation status of forest biodiversity in Central Luzon. Specifically, the project aimed to conduct assessment of the diversity of animals in the selected forest ecosystems of Central Luzon; identify indicators of biological diversity in the forest ecosystems of Central Luzon; determine sources of all levels of impacts of environmental problems/degradation of forest ecosystems in Central Luzon; identify alien/introduced species in the forest ecosystems and their impact on biodiversity; and determine the ecological/economic role/functions of animals in the forest ecosystems of Central Luzon.

## METHODOLOGY

### Study Area

The Pantabangan–Carranglan Watershed Forest Reserve (PCWFR) covers an area of 97,318 ha. where 4023 ha. comprise the water reservoir. The

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watershed was divided into 10 stations. Of these, two stations were selected in the northern part of the PCWFR, two stations in the southern part, two stations in the eastern part, two stations in the western part, and two stations in the center of the watershed. In each station, 10 quadrats were chosen and designated as study areas and were delineated and digitally mapped. The delineated study area was divided into grid with a scale dimension of 10 m × 12 m. The numbers of grids were determined, and a simple lottery method was used to represent the random sampling technique.

## Data Gathering and Documentation

The 4 major groups of animals namely, birds, reptiles, amphibians, and mammals were surveyed, monitored, and recorded in each quadrat. The animals were recorded by monitoring the number of sightings. The following information was gathered: common name, habitat, locality, altitude, province, morphological description of the animal, and ethnobiological information (benefits/uses, values, associated beliefs and practices, etc.). Ethnobiological/ethnopharmaceutical/ethnomedicinal information of the recorded and observed animals was gathered through focus group discussion by means of interview with the local people who are living in the protected area and are knowledgeable about local wildlife and resource use.

Collection and observation of the representative animals that were not known or not identified were conducted through the use of mist nets and binoculars for flying mammals and birds, improvised traps for reptiles and birds, cast nest of small mesh size for small animals, and handpicking for other animals. All animals were photographed and released thereafter.

Pertinent information regarding their habitat, sex, behavior, and economic and ecological importance was also noted. All observed animals were identified and classified based on available Taxonomic Keys, and authentication was done by an expert in Taxonomy of Animals at the National Museum, Manila.

Quantitative descriptions of animals were gathered to compute for the various ecological parameters such as the following: frequency, relative frequency, density, relative density and dominance, relative dominance, and importance value index among others. Species diversity was computed and determined using the Shannon's Diversity Index (Smith & Wilson, 1998). Furthermore, biodiversity indicator was also determined using the formula



( $\text{IndVal}_{ij} = A_{ij} \times B_{ij} \times 100$ ) adapted from Dufrene and Legendre (1997).

Rare, endangered, depleted, endemic, and economically important species of animals were identified. Indicators of biological diversity as well as introduced species were also identified, and their impact on biodiversity was also determined.

## RESULTS AND DISCUSSION

### Assessment of the Diversity of Animals

A total of 53 animals were observed in the Pantabangan–Carranglan Watershed Forest Reserve, Carranglan side. Of these, 33 are birds, seven are mammals, seven are reptiles, and six are amphibians (Table 1).

A total of 41 species of animals were all identified up to species level. Twenty-two species of birds, seven species of mammals, seven species of reptiles, and five species of amphibians were identified. Eleven species of birds and only one species of amphibians were only identified through their local names.

#### ***Birds***

Birds were the most numerous group of vertebrates in the area. Based on the identified species of birds, Order Passeriformes was well represented with seven species. Birds of the Order Columbiformes were represented with three species. Birds of the Orders Strigiformes, Coraciiformes, and Piciformes were represented with two species each. Birds of the Orders Cuculiformes, Falciformes, Graniiformes, and Galliformes were represented with one species each.

#### ***Mammals***

The captured mammals are grouped under Orders Carnivora, Artiodactyla, Primata, Chiroptera, and Rodentia. The seven species of mammals belonging to five Families include two (2) volant mammals from the Family Pteropodidae, two rodents (Muridae), one macaque (Cercopithecidae), one warty pig (Suidae), and one civet cat (Viverridae).

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**(Herpetofauna) Reptiles and Amphibians**

Herpetofaunal assessment was also conducted in Pantabangan–Carranglan Watershed Forest Reserve. A total of 13 species of reptiles and amphibians were recorded and identified. Seven species of reptiles belonging to five Families were identified; three Colubridae and one species each from Gekkonidae, Pythonidae, Varanidae, and Viperidae. A total of six species of amphibians were also recorded. Five species were identified up to genus and species level belonging to three families, two species each for Families Dicroglossidae and Ceratobatrachidae and one species from Family Bombinatoridae.

**IMPORTANCE VALUE INDEX (IVI) OF ANIMALS SURVEYED  
(TABLE 2)**

Results revealed that *Cynniris jugularis* obtained the highest importance value index of 19.32%. The *C. jugularis* is a passerine bird which feeds largely on nectar, although they also take insects, especially when feeding the young. Most species could take nectar by hovering but usually perch to feed most of the time (Birdlife International, 2016). This was followed by an amphibian *Occidozyga laevis*, Gunther, with 17.40% IVI. *O. laevis* is distributed widely in Southeast Asia at elevations up to 1200 masl. This frog is found in a range of habitats, from polluted puddles and marshes to clear mountain streams. This species inhabits forested areas but not disturbed areas. In the Philippines, it can tolerate some disturbed habitat. It also inhabits some pristine lower montane and lowland forests (Zainuddin, 1999).

On the other hand, *Ahaetulla nasuta* got 4.95% IVI while “Baboy Damo”, *Sus philippensis*, obtained 2.78% IVI. *A. nasuta* is a diurnal snake which is commonly found in trees and bushes in the forest and agricultural lands. They feed on frogs, lizards, and birds (Thy et al., 2015). Furthermore, *S. philippensis* is endemic to the Philippines and occurs through most of the country, except in the Palawan Faunal Region. It was formerly abundant from sea level up to at least 2800 m, but now, it is common only in remote forests, montane, and mossy forests (Oliver & Heaney, 2008).

## SPECIES DIVERSITY

Table 3 shows the various diversity indices of vertebrates in Pantabangan–Carranglan Watershed. Shannon’s Diversity Index shows that the 10 stations observed in Pantabangan–Carranglan Watershed Forest Reserve had low avian diversity, with a value of 2.43. Shannon’s Index of Diversity also shows that mammals, reptiles, and amphibians had very low diversity, with values of 1.89, 1.83, and 1.09, respectively. Still, these values imply low diversity with regard to the three groups of vertebrates. This is because of the low number in species observed and the low number of individuals recorded, and many of the vertebrates observed had only 1 to 2 numbers of individuals in all the 10 stations observed in Pantabangan–Carranglan Watershed, Carranglan, Nueva Ecija.

The low diversity of the animals in the forest ecosystem of Pantabangan–Carranglan Watershed Forest Reserve may be the result of human activities such as fires, wildlife hunting, and habitat destruction caused by timber poaching.

## BIODIVERSITY INDICATORS

“Sawsaw-it” (*Cinnyris jugularis*) obtained the highest biodiversity indicator value of 17.5% followed by “Piruka” (*Pycnonotus goiavier*) with 8.82% and “Sante” (sound/sightings only) with 7.31% biodiversity indicator values (Table 3). The findings could be due to the high number of individuals of the species observed and their wide spread distribution. The other groups of animals (mammals, reptiles, and amphibians) had very few numbers of individuals and are less distributed (Table 4).

In Pantabangan–Carranglan Watershed Forest Reserve, it is interesting to note that all of these animals with high biodiversity indicator value are birds.

Biodiversity indicators are quantitative data to measure aspects of biodiversity, ecosystem condition, ecosystem services, and drivers of change and to help understand how biodiversity is changed over time and space (UNEP, 2013). These are species whose presence or absence affects the biodiversity of a particular area. They can serve as important sources of food for the other species, and they can serve as indicators of habitat/ecosystem conditions. Species with more than 80% biodiversity indicator values are

considered as biodiversity indicator species.

The presence of these species is important in determining the habitat/ecosystem condition and the disturbances experienced in the area. The absence of these species may mean that the area is disturbed or is not in good condition anymore. Hence, biodiversity indicator may form as an essential part of monitoring and assessment to give the status of biodiversity in the area.

### **ECOLOGICAL STATUS OF ANIMAL SPECIES IN THE FOREST ECOSYSTEM OF PANTABANGAN-CARRANGLAN WATERSHED FOREST RESERVE (TABLE 5)**

Based on the latest IUCN Red List (2014.2), two species of bird, one reptile, one amphibian, and two species of mammals were evaluated as vulnerable species. These species also had decreasing population trend; thus, they were highly threatened by habitat loss and other ecological disturbances. There were also two near threatened species. One species had not yet been evaluated, and another species is unknown. There were also one bird species, four mammalian species, four reptiles, and two amphibians observed in Pantabangan-Carranglan Watershed Forest Reserve which were listed as least concern. Some of these species had stable or increasing population. However, 13 species were evaluated with decreasing population. In the future, these animals may therefore become threatened because of the threats in their habitat. Furthermore, based on the DAO 2004-15 lists of threatened species, *Haliastur indus*, a bird, was evaluated as endangered species. *Ducula carola*, *Ceyx melanurus*, *Sus philippensis*, and *Varanus salvator* were also listed as vulnerable. Moreover, *Macaca fascicularis philippinensis*, *Python reticulatus*, and *Barbourula busuangensis* were also listed as other threatened species.

### **MAJOR SOURCES OF ENVIRONMENTAL DEGRADATION**

Fire, kaingin, timber poaching, mining, and soil erosion/silt run-off had moderate impacts on the degradation of the Pantabangan-Carranglan Watershed. Quarrying and wildlife hunting posed small impacts on the

Pantabangan–Carranglan Watershed which were being done by the local people (Table 6).

These threats and problem present in the forest ecosystem had great impacts on the biodiversity of the forest ecosystems especially on those species which had been listed in the IUCN Red List and DAO 2004-15. If the area loses valuable floral diversity, the fauna will also be threatened. The loss of biodiversity thus threatens the balance of the ecosystem and the available resources for all the living things associated with the forest ecosystem. Furthermore, a disruption of this biodiversity will also disrupt the normal cycle of nutrients, organic substances, and water and energy flow in the forest ecosystem.

## **CONCLUSION**

There were only a few species of animals recorded in Pantabangan–Carranglan Watershed. The status of the diversity of fauna in the forest ecosystem of Pantabangan–Carranglan Watershed ranged from low to very low. This could be due to the environmental threats which posted moderate and small impacts on the forest ecosystems and the disturbances made by the people living near and inside the forest ecosystems. These threats included illegal logging/timber poaching, fires, soil erosion, kaingin farming, mining, wildlife hunting, and quarrying. These major sources of environmental degradation present in the forest ecosystem had great impacts on the biodiversity of the forest ecosystems.

## **RECOMMENDATIONS**

Based on the results of the study, the following are being recommended.

1. Biodiversity assessment studies should be undertaken in other forest ecosystems in Central Luzon which have not been studied yet in order to complete the Biodiversity Information System (BIS) in Central Luzon.
2. Local ordinances pertaining to “Biodiversity Conservation” should be done by the local community to preserve and conserve wildlife and those plants that are now critically endangered, endangered, threatened, and vulnerable.

3. Biodiversity monitoring should be regularly conducted specifically to monitor the status of biodiversity and the status of the identified biodiversity indicators in this study.

## ACKNOWLEDGMENTS

We would like to convey our heartfelt gratefulness to our funding agency, Philippine Council for Agriculture, Aquatic, and Natural Resources Research Development (PCAARRD), Department of Science and Technology (DOST), for the trust and confidence especially in our abilities to come up with significant outputs and in the accomplishment of our objectives.

We would also like to express our deepest gratitude to the tribes of the Magbukon-aetas of Abucay, Bataan; Dumagat tribes of San Luis and Baler, Aurora; and Kalanguyas in Carranglan, Nueva Ecija; and to the members of the barangay and tribal council of the different barangays included in the study areas for their assistance during the conduct of the study. Sincere gratitude is also due to the cooperating agencies, the CENRO/MENROs, PENROs, DENR, PAMB, and PAWB for their assistance in gathering of data. Our gratitude also goes to military detachments of the respected barangays for ensuring the safe passage of the research team and the National Museum of the Philippines for the identification of several species.

The Project Team would also like to thank also the local government units of Carranglan in Nueva Ecija, Baler and San Luis in Aurora, and Abucay and Balanga in Bataan for their invaluable support and cooperation in the project activities. Out thanks also go to the Regional Office of the Department of Environment and Natural Resources (DENR Region 3) which provided assistance in data collection and coordinating activities.

Sincere thanks are also extended to our partner agencies, Aurora State College of Technology (ASCOT), and Bataan Peninsula State University (BPSU) for their help, collaboration, and joint efforts in the conduct of the study, field work, and mapping of activities.

We would also like to express our deepest appreciation to our previous and retired University President, Dr. Ruben C. Sevilleja and Dr. Raul D. Divina, present OIC, Office of the President; Dr. Teotimo M. Aganon, retired VP for RET; Dr. Emilio M. Cruz, Vice-President for Research, Extension, and Training; and Dr. Tereso A. Abella, present Vice President of Academic Affairs for the continuous support and guidance in the implementation and

completion of the project. Warm thanks are also due to all ICCEM Faculty and Staff and to the VPRET Staff, CLSU Administration for all the help, assistance, and cooperation during the conduct of the study.

In particular, the Project Team would like to thank the watershed community for their active participation and collaboration. They devoted much of their time in providing relevant information and guiding us to project sites. Their honesty, generosity, and tolerance in regard to our inquiries can never be adequately compensated. We wish to thank the community representatives and the government agencies that contributed to the data validation process and who participated throughout the consultative workshops.

Most of all, thanks to our Almighty God for His guidance and protection as well as for the wisdom He bestowed on us during the conduct of the research study and in the fulfillment of the project.

**Table 1.** Computed ecological parameters of the surveyed animals in Pantabangan-Carranglan Watershed Forest Reserve, Nueva Ecija.

| Local Name/Scientific Name           | No. of Individuals | F   | RF (%)    | D         | RD (%)     | Do         | RDo (%)    | IVI (%)    |
|--------------------------------------|--------------------|-----|-----------|-----------|------------|------------|------------|------------|
| <b>BIRDS</b>                         |                    |     |           |           |            |            |            |            |
| <i>Cinnyris jugularis</i>            | 40                 | 0.7 | 6.5420560 | 0.0033333 | 12.3456790 | 0.0567     | 0.43105139 | 19.3187864 |
| Pipit                                | 30                 | 0.7 | 6.5420560 | 0.0025    | 9.25925925 | 0.0756     | 0.57473519 | 16.3760505 |
| <i>Pycnonotus goiavier</i>           | 25                 | 0.5 | 4.6728971 | 0.0020833 | 7.71604938 | 0.0648     | 0.49263017 | 12.8815767 |
| <i>Ceyx melanurus</i>                | 23                 | 0.5 | 4.6728971 | 0.0019166 | 7.09876543 | 0.07043478 | 0.53546757 | 12.3071302 |
| Sante                                | 22                 | 0.5 | 4.6728971 | 0.0018333 | 6.79012345 | 0.07363636 | 0.55980701 | 12.0228276 |
| <i>Lonchura punctulata</i>           | 8                  | 0.5 | 4.6728971 | 0.0006666 | 2.46913580 | 0.2025     | 1.53946928 | 8.68150228 |
| <i>Sarcops calvus</i>                | 12                 | 0.4 | 3.7383177 | 0.001     | 3.70370370 | 0.108      | 0.8210502  | 8.26307174 |
| <i>Ptnopilius occipitalis</i> Gray   | 9                  | 0.4 | 3.7383177 | 0.00075   | 2.77777777 | 0.144      | 1.09473371 | 7.61082924 |
| <i>Penelopides manillae</i>          | 5                  | 0.4 | 3.7383177 | 0.0004166 | 1.54320987 | 0.2592     | 1.97052068 | 7.25204831 |
| <i>Haliastur indus</i>               | 3                  | 0.3 | 2.8037383 | 0.00025   | 0.92592592 | 0.324      | 2.46315084 | 6.19281509 |
| <i>Mulleripicus funebris</i>         | 4                  | 0.3 | 2.8037383 | 0.0003333 | 1.23456790 | 0.243      | 1.84736313 | 5.88566935 |
| <i>Phapitreron leucotis</i> Temminck | 2                  | 0.2 | 1.8691588 | 0.0001666 | 0.61728395 | 0.324      | 2.46315084 | 4.94959367 |
| <i>Phaenicophaeus cumingi</i>        | 2                  | 0.2 | 1.8691588 | 0.0001666 | 0.61728395 | 0.324      | 2.46315084 | 4.94959367 |
| <i>Turnix ocellatus</i>              | 2                  | 0.2 | 1.8691588 | 0.0001666 | 0.61728395 | 0.324      | 2.46315084 | 4.94959367 |
| <i>Gallus gallus philippensis</i>    | 2                  | 0.2 | 1.8691588 | 0.0001666 | 0.61728395 | 0.324      | 2.46315084 | 4.94959367 |
| <i>Zosterops nigrorum</i>            | 6                  | 0.2 | 1.8691588 | 0.0005    | 1.85185185 | 0.108      | 0.82105028 | 4.54206101 |
| <i>Lonchura leucogastra</i>          | 5                  | 0.2 | 1.8691588 | 0.0004166 | 1.54320987 | 0.1296     | 0.98526034 | 4.39762909 |
| Bullisi                              | 4                  | 0.2 | 1.8691588 | 0.0003333 | 1.23456790 | 0.162      | 1.23157542 | 4.33530220 |
| <i>Ducula carola</i>                 | 10                 | 0.1 | 0.9345794 | 0.0008333 | 3.08641975 | 0.0324     | 0.24631508 | 4.26731427 |

|                             |            |     |            |             |            |            |            |            |
|-----------------------------|------------|-----|------------|-------------|------------|------------|------------|------------|
| Pakaw                       | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Otus longicornis            | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Patat                       | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Hulak                       | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Ninox philippensis          | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Megalaima haemacephala      | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Muscicapa griseisticta      | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Talaktak                    | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Buh-Buhiyap                 | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Bayik                       | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Sterna hirundo              | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Kuwago                      | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Coracinastriata             | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Bugkiyaw                    | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| <b>MAMMALS</b>              |            |     |            |             |            |            |            |            |
| Megaerops wetmorei          | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Macaca fasc. Philippinensis | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Paradoxurus hermaphroditus  | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Cynopterus brachyotis       | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Phloeomys ballidus          | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Sus philippensis            | 2          | 0.1 | 0.9345794  | 0.0001666   | 0.61728395 | 0.162      | 1.23157542 | 2.78343881 |
| Bullimus luzonicus          | 2          | 0.1 | 0.9345794  | 0.0001666   | 0.61728395 | 0.162      | 1.23157542 | 2.78343881 |
| <b>REPTILES</b>             |            |     |            |             |            |            |            |            |
| Ahaetulla nasuta            | 2          | 0.2 | 1.8691588  | 0.0001666   | 0.61728395 | 0.324      | 2.46315084 | 4.94959367 |
| Dendrelaphis marenae        | 3          | 0.2 | 1.8691588  | 0.00025     | 0.92592592 | 0.216      | 1.64210056 | 4.43718537 |
| Cyrtodactylus philippinicus | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Trimeresurus flavomaculatus | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Calamaria bitorques         | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Varanus salvator            | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Python reticulatus          | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| <b>AMPHIBIANS</b>           |            |     |            |             |            |            |            |            |
| Occidozyga laevis           | 50         | 0.2 | 1.8691588  | 0.0041666   | 15.4320987 | 0.01296    | 0.09852603 | 17.3997836 |
| Barboula busuangensis       | 4          | 0.4 | 3.7383177  | 0.0003333   | 1.23456790 | 0.324      | 2.46315084 | 7.43603650 |
| Limnonectes microcephalus   | 19         | 0.1 | 0.9345794  | 0.0015833   | 5.86419753 | 0.01705263 | 0.12963951 | 6.92841648 |
| Platymantis dorsalis        | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Palaka (Frog #5)            | 1          | 0.1 | 0.9345794  | 8.33333E-05 | 0.30864197 | 0.324      | 2.46315084 | 3.70637226 |
| Platymantis dorsalis        | 2          | 0.1 | 0.9345794  | 0.0001666   | 0.61728395 | 0.162      | 1.23157542 | 2.78343881 |
| <b>TOTAL</b>                | <b>324</b> |     | <b>100</b> |             | <b>100</b> |            | <b>100</b> | <b>300</b> |



**Table 2.** Animals with the highest number of importance value index (IVI) present in Pantabangan–Carranglan Watershed Forest Reserve.

| Class      | Species Name                 | Importance Value Index (IVI) |
|------------|------------------------------|------------------------------|
| Birds      | Cinnyris jugularis           | 19.32                        |
| Mammals    | Sus philippensis             | 2.78                         |
| Reptiles   | Ahaetulla nasuta             | 4.95                         |
| Amphibians | Occidozygal aevis<br>Gunther | 17.40                        |

**Table 3.** Diversity indices of four groups of animals observed in Pantabangan–Carranglan Watershed Forest Reserve.

| Group      | No. of Species | No. of Individuals | Diversity Index | Interpretation |
|------------|----------------|--------------------|-----------------|----------------|
| Birds      | 33             | 228                | 2.43            | Low            |
| Mammals    | 7              | 9                  | 1.89            | Very Low       |
| Reptiles   | 7              | 10                 | 1.83            | Very Low       |
| Amphibians | 6              | 77                 | 0.98            | Very Low       |

**Table 4.** Animals in Pantabangan–Carranglan Watershed Forest Reserve with high biodiversity indicator values.

| Species Name                   | Aij  | Bij  | Ind Val |
|--------------------------------|------|------|---------|
| Sawsaw-it (Cinnyris jugularis) | 0.5  | 0.35 | 17.5    |
| Piruka (Pycnonotus goiavier)   | 0.42 | 0.21 | 8.82    |
| Sante (sound/sightings only)   | 0.43 | 0.17 | 7.31    |
| Pipit (sound/sightings only)   | 0.32 | 0.22 | 7.04    |
| Balog (sound/sightings only)   | 0.29 | 0.07 | 2.03    |

**Table 5.** Ecological status of animal species observed in Pantabangan–Carranglan Watershed Forest Reserve, Carranglan.

| Fauna                       | Scientific Name      | Conservation Status and Population Trend |             |
|-----------------------------|----------------------|--|-------------|
|                             |                      | IUCN 2013.1                              | DAO 2004-15 |
| BIRDS                       |                      |  |             |
| Spotted Imperial Pigeon     | Ducula carola        | Vulnerable (D)                           | Vulnerable  |
| Philippine Dwarf Kingfisher | Ceyx melanurus       | Vulnerable (D)                           | Vulnerable  |
| White Bellied Munia         | Lonchura leucogastra | Least Concern (S)                        |             |
| Olive Backed Sunbird        | Cinnyris jugularis   | Least Concern (S)                        |             |

|                                |   |                     |                          |
|--------------------------------|---|---------------------|--------------------------|
| Philippine Hawk-owl            | <i>Ninox philippensis</i>                 | Least Concern (S)   |                          |
| Sooty Woodpecker               | <i>Mulleripicus funebris</i>              | Least Concern (S)   |                          |
| Grey-streak Flycatcher         | <i>Muscicapa griseisticta</i>             | Least Concern (S)   |                          |
| White-eared Brown Dove         | <i>Phapitreron leucotis</i>               | Least Concern (S)   |                          |
| Yellow-vented Bulbul           | <i>Pycnonotus goiavier</i>                | Least Concern (I)   |                          |
| Coppersmith Barbet             | <i>Megalaima haemacephala</i>             | Least Concern (I)   |                          |
| Luzon Tarictic Hornbill        | <i>Penelopides manillae</i>               | Least Concern (D)   |                          |
| Scale-feathered Malhoka        | <i>Phaenicophaeus cumingi</i>             | Least Concern (D)   |                          |
| Brahminy Kite                  | <i>Haliastur indus</i>                    | Least Concern (D)   | Endangered               |
| Bar-bellied Cuckoo-shrike      | <i>Coracina striata</i>                   | Least Concern (D)   |                          |
| Red Jungle Fowl                | <i>Gallus gallus</i>                      | Least Concern (D)   |                          |
| Yellowish White-eye            | <i>Zosterops nigrorum</i>                 | Least Concern (U)   |                          |
| Spotted Buttonquail            | <i>Turnix ocellatus</i>                   | Least Concern (U)   |                          |
| Coledo                         | <i>Sarcops calvus</i>                     | Least Concern (U)   |                          |
| MAMMALS                        |   |                     |                          |
| White-collared Fruit Bat       | <i>Megaerops wetmorei</i>                 | Vulnerable (D)      |                          |
| Philippine Warty Pig           | <i>Sus philippensis</i>                   | Vulnerable (D)      | Vulnerable               |
| Philippine Long-Tailed Macaque | <i>Macaca fascicularis philippinensis</i> | Near Threatened (D) | Other Threatened Species |
| Common Palm Civet              | <i>Paradoxurus hermaphroditus</i>         | Least Concern (S)   |                          |
| Northern Luzon Giant Cloud Rat | <i>Phloeomys ballidus</i>                 | Least Concern (S)   |                          |
| Large Luzon Forest Rat         | <i>Bullimus luzonicus</i>                 | Least Concern (U)   |                          |
| Common Short-nosed Fruit Bat   | <i>Cynopterus brachyotis</i>              | Least Concern (U)   |                          |
| REPTILES                       |   |                     |                          |
| Common Water Monitor           | <i>Vartanus salvator</i>                  | Vulnerable (D)      | Vulnerable               |
| Philippine Pit Viper           | <i>Trimeresurus flavomaculatus</i>        | Least Concern (S)   |                          |
| Asian Vine Snake               | <i>Ahaetulla nasuta</i>                   | Least Concern (S)   |                          |
| Philippine Bent-toed Gecko     | <i>Cyrtodactylus philippinicus</i>        | Least Concern (S)   |                          |
| Banded Worm Snake              | <i>Calamaria bitorquis</i>                | Least Concern (U)   |                          |
| Reticulated Python             | <i>Python reticulatus</i>                 | Not Evaluated (U)   | Other Threatened Species |
| Painted Bronzeback             | <i>Dendrelaphis marenae</i>               | Unknown (U)         |                          |

| AMPHIBIANS                  |                           |                     |                          |
|-----------------------------|---------------------------|---------------------|--------------------------|
| Philippine Flat-headed Frog | Barbourula busuangensis   | Vulnerable (D)      | Other Threatened Species |
| Luzon-fanged Frog           | Limnonectes microcephalus | Near Threatened (D) |                          |
| Common Puddle Frog          | Occidozyga laevis         | Least Concern (S)   |                          |
| Common Forest Frog          | Platymantis dorsalis      | Least Concern (D)   |                          |

**Table 6.** Sources of environmental degradation in the three forest ecosystem of Pantabangan–Carranglan Watershed Forest Reserve.

| Sources of Environmental Degradation Scale and Impacts |                      |
|--|----------------------|
| Fire   | 2.92 Moderate impact |
| Kaingin  | 2.76 Moderate impact |
| Illegal logging/Timber poaching                        | 2.69 Moderate impact |
| Mining   | 2.67 Moderate impact |
| Soil erosion/Silt run-off                              | 2.66 Moderate impact |
| Quarrying  | 2.18 Small impact    |
| Wildlife hunting                                       | 2.13 Small impact    |

## AUTHORS

Annie Melinda Paz-Alberto is Director and Project Leader, Shirly C. Serrano is Faculty and Project Staff, and Daryl A. Juganas is Science Research Assistant, all at the Institute for Climate Change and Environmental Management, Central Luzon State University, Science City of Muñoz, Nueva Ecija.

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# **IEC and Technology Transfer for Biodiversity Conservation and Utilization in Central Luzon**

**Annie Melinda Paz-Alberto, Shirly C.  
Serrano, Roann P. Alberto, Janice Faye  
S. Ang, Daryl A. Juganas, Kathrina M.  
Mapanao, and Princess Joy C. Hernando**  
*Central Luzon State University, Science City of  
Muñoz, Nueva Ecija, Philippines*

This study was conducted to enhance public awareness on the importance of biodiversity for better appreciation and participation in conservation programs and organize the local communities for meaningful participation in program activities. Training on biodiversity and nature conservation and promotion of green technology were conducted as well as technology transfer to farmers, SDU multisectoral networks, LGUs, students, and interested individuals/organizations for possible adoption.

Pamphlets, brochures, and handbooks on biodiversity and nature conservation and environmental problems/issues affecting biodiversity were prepared, developed, produced, and printed for public education/awareness. Furthermore, videos on the biodiversity of Central Luzon entitled Video on Flora and Video on Fauna in Central Luzon were also prepared, developed, and produced for environmental information and awareness. Furthermore, seminar-workshops on biodiversity conservation and utilization in Central Luzon were conducted in Carranglan, Nueva Ecija; Baler, Aurora; and Balanga, Bataan. Moreover, media linkages through print and broadcast media were undertaken for wider information dissemination. Promotional activities through different social media were also utilized including Facebook, Twitter, and Instagram.

Green technology promotion and transfer were also carried out in the three study sites wherein brochures, posters, videos, and jingles on botanical pesticides and phytoremediation were promoted. Field demonstrations were also conducted to farmers, SDU multisectoral networks, LGUs, students, and interested individuals/organizations as part of the promotion and transfer of technology.

The IEC materials and other promotional campaign materials are very effective and important instruments for public awareness and education. Hence, they are very potent tools in biodiversity conservation

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and green technology transfer for possible adoption.

**Keywords:** Biodiversity Conservation, Green technology, IEC, Technology Transfer

## INTRODUCTION

Applied communication, a specific discipline under development communication, is the planned and systematic use of communication for the application of science. It aims to specify the internalization and utilization of research and useful indigenous information and technology, so these are integrated into the development process. Further, applied communication aims to disseminate research information and technologies through a variety of appropriate communication channels, modern communication technology, and interagency arrangements and strategies so that they may actively participate in research diffusion and utilization (ACD, PCAARRD Leaflet, 1993).

With the above premise, IEC can be a potent tool in biodiversity conservation. By proper identification of a suitable media for the target clientele, it is indeed an effective channel through which community leaders, members, and other stakeholders can develop awareness and skills that could help prevent biodiversity erosion.

In view of the problems and concerns which constantly threaten the future of the country's biodiversity and in consonance with the Convention on Biological Diversity's objectives of conservation, sustainable use, and equitable sharing of the benefits of the country's biodiversity, a National Biodiversity Strategy and Action Plan with modular programs and projects and corresponding resource requirements was formulated. The IEC component aims to build up people's appreciation of the values, attributes, and conservation approaches to biodiversity resources at the community level to ensure people's participation ([www.psdn.org.ph](http://www.psdn.org.ph)).

Hence, this study was conducted primarily to produce brochures and fact sheets on biodiversity and nature conservation, a handbook on economic plants, handbook on flora and handbook on fauna in selected forest ecosystems in Central Luzon, and pamphlet on Indigenous Knowledge System (IKS). This study also aimed to enhance public awareness on the importance of biodiversity for better appreciation and participation in conservation programs; to organize the local communities for meaningful participation in program activities; to train stakeholders on biodiversity and

nature conservation and promotion of green technology; and to undertake green technology promotion/transfer to farmers, SDU multisectoral networks, LGUs, students, and interested individuals/organizations for possible adoption.

## **METHOD**

### **Publication of IEC Materials (Print and Audio–Video)**

Pamphlets and brochures on biodiversity and nature conservation and environmental problems/issues affecting biodiversity were prepared, developed, produced, and printed for public education and awareness. All IEC materials were reviewed by experts on flora and fauna and experts on environmental science in PCAARRD, DOST, and DENR before these IEC materials were published and disseminated.

These IEC materials were launched and distributed during the meetings of the provincial, municipal, and barangay board and/or during the barangay seminar-workshop in Carranglan, Nueva Ecija; Baler, Aurora; and Abucay, Bataan for environmental awareness in order for them to be prepared and more equipped in their community-based environmental management.

On the other hand, from the data that were gathered in Activities 1 and 2 of a project which focused on the assessment of diversity of plants and animals in the selected forest ecosystems in Central Luzon, three handbooks were prepared, produced, and printed. Examples of handbooks and brochures are as follows: Handbook on Flora in Central Luzon, Handbook on Fauna in Central Luzon, and Handbook on Economic Plants in Central Luzon; Brochures on Environmental Issues Affecting the Forest Ecosystems to wit: Kaingin (Slash and Burn), Pangangaso (Wildlife Hunting), and Pagmimina (Mining); and brochures on Biodiversity Conservation (Pangangalaga sa Laksang Buhay). Brochures and pamphlets on Indigenous Knowledge System (IKS) were also developed, published, and disseminated.

In addition, videos on the biodiversity of Central Luzon entitled “Video on Flora in Central Luzon” and “Video on Fauna in Central Luzon” were prepared, developed, and produced for environmental education and awareness.

Furthermore, seminar-workshops on biodiversity conservation and utilization in Central Luzon were also conducted in Carranglan, Nueva



Ecija; Baler, Aurora; and Abucay, Bataan in Central Luzon.

## **Green Technology Promotion**

Green technology promotion and transfer was also one of the ultimate outputs of this project. Positive results that were gained from another project particularly in the screening for plants that exhibit potential phytoremediation and pesticidal properties were promoted to the local communities. Brochures, fact sheets, field demonstrations, and trainings for farmers, SDU multisectoral networks, LGUs, students, and interested individuals/organizations were conducted as part of the promotion and transfer of technology.

Moreover, media linkages through print and broadcast media were undertaken for wider information dissemination. Likewise, the technology was also introduced to the different Farmer's Information Technology Services (FITS) Center for utilization.

## **RESULTS AND DISCUSSION**

### **Preparation, production, and publication of IEC materials**

Various IEC materials for promotion of biodiversity conservation and utilization were prepared, produced, and published (Table 1). Figures 1–2 illustrate some of these brochures and pamphlets on environmental issues, biodiversity conservation, and IKSP. These IEC materials were disseminated to various stakeholders for public awareness and information.

**Table 1.** IEC materials for promotion of biodiversity conservation and utilization.

| Project   | Title of IEC  | Type of IEC | Dialect |
|-----------|---|-------------|---------|
| Project 1 | Biodiversity Conservation   | Brochure    | English |
|           | Pangangalaga sa Laksang-Buhay   | Brochure    | Tagalog |
|           | <b>Environmental Issues Affecting the Ecosystems</b>  |             |         |
|           | Slash and Burn  | Brochure    | English |
|           | Kaingin   | Brochure    | Tagalog |
|           | Mining  | Brochure    | English |
|           | Pagmimina   | Brochure    | Tagalog |
|           | Wildlife Hunting  | Brochure    | English |
|           | Pangangaso  | Brochure    | Tagalog |
|           | Handbook on Flora in Central Luzon  | Handbook    | English |
|           | Handbook on Fauna in Central Luzon  | Handbook    | English |
|           | Handbook on Economic Plants in Central Luzon  | Handbook    | English |
|           | Video on Flora in Central Luzon   | Video       | English |
|           | Video on Fauna in Central Luzon   | Video       | English |
| Project 3 | Indigenous Knowledge System and Practices of Kalanguya for Biodiversity Conservation and Utilization                  | Brochure    | English |
|           | Mga Katutubong Kaalaman at Kaugalian ng mga Kalanguya para sa Pangangalaga at Paggamit ng mga Samu't saring buhay     | Brochure    | Tagalog |
|           | Indigenous Knowledge System and Practices of Magbukon-Ayta for Biodiversity Conservation and Utilization              | Brochure    | English |
|           | Mga Katutubong Kaalaman at Kaugalian ng mga Magbukon-Ayta para sa Pangangalaga at Paggamit ng mga Samu't saring buhay | Brochure    | Tagalog |
|           | Indigenous Knowledge System and Practices of Dumagat for Biodiversity Conservation and Utilization                    | Brochure    | English |
|           | Mga Katutubong Kaalaman at Kaugalian ng mga Dumagat para sa Pangangalaga at Paggamit ng mga Samu't saring buhay       | Brochure    | Tagalog |
|           | Indigenous Knowledge System and Practices for Biodiversity Conservation and Utilization                               | Pamphlets   | English |
|           | Mga Katutubong Kaalaman at Kaugalian para sa Pangangalaga at Paggamit ng mga Samu't saring buhay                      | Pamphlets   | Tagalog |



Figure 1. Samples of IEC materials developed on biodiversity conservation and some environmental issues present in the forest ecosystems of Central Luzon.

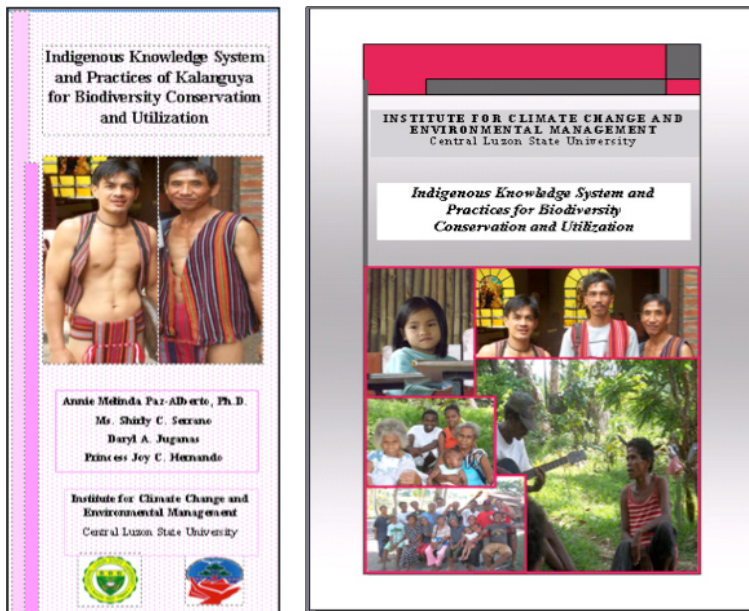


Figure 2. Samples of IEC materials developed on Indigenous Knowledge Systems on biodiversity conservation.

## Enhancement of Public Awareness on the Importance of Biodiversity Conservation

Promotional materials, specifically tri-media presentations and collateral materials, were developed to create awareness on biodiversity and the importance of Carranglan Watershed, Carranglan, Nueva Ecija; Bataan Natural Park, Abucay, Bataan; Baler Forest Reserve, Baler, Aurora; and Dibut River Watershed, San Luis, Aurora in Central Luzon. Marketing students from the College of Business Administration and Accountancy who had been taking up Advertising and Sales Promotions and Marketing Management students were tapped to come up with the best advertisement campaigns. They actively participated in conceptualizing, creating, and executing the advocacy campaigns on biodiversity conservation. Different IEC materials and promotional materials and activities were developed and conducted (Table 2).

**Table 2.** IEC materials developed and promotional activities conducted for promotion of biodiversity conservation and utilization.

| Types of Promotional Materials                            | Title of Promotional Materials  | No. of Materials Produced                              |
|---|---|--|
| Posters   | Posters on Biodiversity Awareness and Watershed Conservation in Carranglan Watershed (20), Bataan Natural Park (12), Dibut River Watershed and Baler Forest Reserve (6) | 38   |
| Posters   | Posters on Environmental Issues regarding Kaingin, Wildlife Hunting and Landslide (4) and Environmental Protection (1)  | 5  |
| Videos for Commercial advertisements                      | Status and Importance of Biodiversity for Biodiversity Awareness and Watershed Conservation   | 18   |
| Variety show  | “Gift to Biodiversity (G2B)” and “Gift to Biodiversity (G2B V.2.0)”   | 2  |
| Social Media Networking: Facebook, Twitter, and Instagram | Gift to Biodiversity website  | 3  |
| Advocacy campaign   | “Piso Para Sa Carranglan”, t-shirt printing for a cause, biodiversity conservation booth, G2B photo booths, and mini concert.   | T-shirts/G2B Booth; 2 G2B Photo booth; 2 mini concerts |

|                         |   |                             |
|-------------------------|---|-----------------------------|
| Road shows and campaign | Local celebrities, locally known personalities and different stakeholders in Central Luzon were also convinced to post pictures to promote the advertisement campaign on biodiversity conservation. | 87 road shows and campaigns |
|-------------------------|---|-----------------------------|

Moreover, three seminar-workshops were conducted in the three study areas to promote biodiversity conservation. The main theme of the three seminars was “Sama-samang Pagkilos Tungo sa Pagpapaunlad at Pangangalaga sa Kabundukan at Tubig Kanlungan”. The main objective of the activity was to enhance public awareness and education on biodiversity conservation and utilization in the Selected Forest Ecosystems in Central Luzon and to possibly create and implement a biodiversity conservation plan in the area.

The seminar-workshops were attended by participants from various government and private offices, representing indigenous people organizations, LGU officials and councils, church workers, students, researchers, and faculty and staff from Carranglan, Nueva Ecija; Abucay, Bataan; and Baler, Aurora.

There were six topics presented during the seminar-workshops namely Biodiversity and Nature Conservation in the Philippines; Mining and Its Effect and Impact on Biodiversity; Slash and Burn (Kaingin) Farming System and Its Effects in the Forest Ecosystem; Wildlife Hunting: A Major Threat to Biodiversity; Phytoremediation: A Green Technology to Remove Pollutants for Soil and Water Conservation; and Antimicrobial Activity of Medicinal Plants for the Common Pathogen of Animals, Human and Antimicrobial Screening of Potential Botanical Pesticides.

Furthermore, workshops were also conducted, and the commitments and pledges were given by the different stakeholders to conserve and protect the biodiversity in the three watersheds. The participants were grouped and instructed to make an action plan and commitment for biodiversity conservation and utilization (Table 3). The participants from the different study sites were delighted by the items given to them as promotional materials which included t-shirts, pins, ballpens, and ecobags.

Pamphlets and brochures on biodiversity conservation and on green technology such as botanical pesticide and phytoremediation which were developed and produced were also given to the participants.

**Table 3.** Commitments and plans of participants in the seminar-workshop for biodiversity conservation in the study areas.

| Group  | Commitment to Save Biodiversity   |
|--|---|
| <b>Carranglan Watershed, Carranglan, Nueva Ecija</b> | 1. <i>“Magbantay sa mga ilegal na nagmimina sa aming lugar”.<br/>“Magtanim ng tambo sa bakuran at gawin itong walis upang mapagkakitaan”.</i>   |
|  | 2. <i>“Magbantay at magpatupad ng mga batas tungo sa pangangalaga sa Carranglan Watershed.”<br/>“Magtanim ng mga halaman gaya ng prutas at gulay sa bakuran na siyang maaaring pagkunan ng pangkabuhayan”</i>   |
|  | 3. <i>“Magkaroon ng Autoridad ang mga local na mamamayan na magpatupad ng batas” at “Isulong ang pakakaroon ng eco-tourism site sa Carranglan Watershed”.</i>   |
|  | 4. <i>“Magparami ng mga seedlings na itatanim sa Watershed at magpapatupad ng batas sa pangugubat at pagkakaingin” at “Magtayo ng nursery para sa mga gulay at puno at gayundin ang paghahayupan sa lugar”.</i> |
| <b>Baler Forest Reserve, Baler, Aurora</b>           | 1. <i>“Magbantay sa mga nagtatapon ng basura sa aming lugar”.</i>   |
|  | 2. <i>“Magtanim ng mga punog kahoy”.</i>  |
|  | 3. <i>“Ipatupad ang mga batas pangkalikasan”</i>  |
|  | 4. <i>“Patuloy na pangnalagan ang Tubig-Kanlungan”</i>  |
|  | 5. <i>“Bantayan ang mga nag-huhuntig sa lugar”</i>  |
|  | 6. <i>“Magtayo ng eco-tourism area sa lugar”</i>  |
| <b>Bataan Natural Park, Abucay, Bataan</b>           | 1. <i>“Pangangalaga sa mga tubig kanlungan, Reforestation, at Mahigpit na implementasyon sa mga lumalabag sa batas”.</i>  |
|  | 2. <i>“Watershed Rehabilitation, Appropriate Forest Cover, Ibalik sa mga Indigenous People ang mga lupang katutubo, pangangalaga sa kabundukan at IEC campaign”</i>   |
|  | 3. <i>“Magtanim ng mga puno, Gamitin ng maayosat palitan ang mga puno o halaman, alagaan ang mga hayop sa ilang. Magtanim ng Punong Kahoy para maalagaan ang ating lupa”</i>                                    |
|  | 4. <i>“Tamang pagtapon ng mga basura, pagtatanim ng mga ibat-ibang halaman (tree planting) at paghahayupan.”</i>  |
|  | 5. <i>“Pagtatanim ng mga punog kahoy, palitan ang mga punong GMELINA, organic, vegetable and herbal gardening at palaganapin ang kaalaman sa science para sa mga IPs.”</i>                                      |

## GREEN TECHNOLOGY PROMOTION

### Preparation of comic books, brochures, and videos

The IEC materials such as brochures, comic books, and videos on botanical pesticides were also prepared, developed, and produced (Table 4).

**Table 4.** IEC materials developed for green technology promotion.

|                  | <b>Title of IEC</b>   | <b>Type of IEC</b> | <b>Dialect</b> |
|------------------|---|--------------------|----------------|
| <b>Project 2</b> | Botanical Pesticide   | Brochure           | English        |
|                  | Pestisidyong Halaman  | Brochure           | Tagalog        |
|                  | Pamuksa (Botanical Pesticide)   | Comics             | Tagalog        |
|                  | Panipsip (Phytoremediation)   | Comics             | Tagalog        |
|                  | Audio-visual presentation for Botanical Pesticides/Pestisidyong Halaman | Video              | Tagalog        |

### **Enhancement of public awareness on the importance of green technology**

Field demonstrations and trainings were conducted as part of the promotion and transfer of the green technology specifically regarding the importance and results of studies on botanical pesticide and phytoremediation to farmers, SDU multisectoral networks, LGUs, students, and interested individuals/organizations. Media linkages through print and broadcast media were undertaken for wider information dissemination. Likewise, the technologies were introduced to the different Farmer's Information Technology Services (FITS) Center for utilization.

Promotional materials, specifically tri-media presentations and collateral materials, were developed to create awareness on the importance of green technology in Carranglan Watershed, Bataan Natural Park and Baler Forest Reserve in Central Luzon (Table 5).

**Table 5.** Campaign materials developed for green technology promotion.

| <b>Title of IEC</b>  | <b>Type of IEC</b> |
|--|--------------------|
| Botanical Pesticide Promotion                                    | Poster             |
| Logo used in Botanical Pesticide for T-shirts, Fans, and Ecobags | Logo               |
| Logo used in Phytoremediation for Comics                         | Logo               |
| Promotional Jingle on Botanical Pesticide                        | Video              |
| Promotional Jingle on Phytoremediation                           | Video              |

Green technology (botanical pesticide) promotion and field demonstration with the theme "Ang Pestisidyong Halaman na Gamit sa Pananim Para sa Kaligtasan at Kalusugan ng Tao" were held in Carranglan, Nueva Ecija, Baler, Aurora and Balanga, Bataan. These promotional

campaigns and field demonstrations were organized by the Institute for Climate Change and Environmental Management (ICCEM), CLSU as the lead agency in cooperation with the different Municipal/City Agriculture Offices (MAO/CAO) in the study sites. The main objective of these activities was to train stakeholders on promotion of green technology and to undertake green technology promotion/transfer to farmers, SDU multisectoral networks, LGUs, students, and interested individuals/organizations for possible adoption.

The promotion and field demonstration were attended by participants who came from various government offices (LGUs), indigenous people organizations and councils, and farmers.

The participants from Carranglan, Nueva Ecija; Baler, Aurora; and Abucay, Bataan were very glad and thankful for the items given to them as promotional materials which included long sleeve shirts, novelty ballpens, and ecobags as well as brochures and comic books which, according to them, would increase and enhance their knowledge on botanical pesticides and phytoremediation.

The various IEC materials which were developed, produced, published, and disseminated and the promotional activities conducted filled the gap on the general lack of campaign about the importance of biodiversity conservation in the forest ecosystems. Campaigns are necessary to address biodiversity crisis because behaviors of individuals are significant for addressing the problem. Effective mass media campaigns are a powerful vehicle for giving awareness and information to the public. Therefore, these IEC and promotional materials increased the knowledge of the local communities and other stakeholders with regard to biodiversity conservation, and these provided accessible up-to-date information on the status of biodiversity which could give guidance in their planning and decision making. Similar findings were obtained by various organizations that utilized IEC in their campaigns (Zimbabwe National Planning Council, 2010; Tanggol Kalikasan, 2004; IPM-CRSP, 2002). According to them, IEC proved to increase awareness and change attitudes and practices as well as bring about change in specific behaviors. The IEC materials also improved the general well-being of individuals and community by encouraging people to be responsible for their own actions through their own efforts.



## Evaluation of Activities Conducted for Biodiversity Conservation and Utilization in Central Luzon and Green Technology (Botanical Pesticide) Promotion and Field Demonstration

Evaluation of the effectiveness and satisfaction rating on the different promotional activities for “Biodiversity Conservation and Utilization in Central Luzon” and “Green Technology (Botanical Pesticide) Promotion and Field Demonstration” was conducted.

Table 6 shows the result of the evaluation during the conduct of the “Seminar-workshop on Biodiversity Conservation and Utilization in Central Luzon” in the three study sites namely, Carranglan, Nueva Ecija; Baler, Aurora; and Abucay, Bataan.

**Table 6.** Evaluation and ratings of the seminar-workshop on biodiversity conservation and utilization in the three study sites in Central Luzon.

| Overall Rating  |                  |                  |             |
|---|------------------|------------------|-------------|
| Questions   | Ratings          |                  |             |
|   | Yes (%)          | No (%)           |             |
| Are you satisfied for the trainings provided to you regarding biodiversity conservation?                                | 99.19            | 0.81             |             |
| Is the training adequate and complete?  | 99.19            | 0.81             |             |
| Did you get what you need to know about biodiversity conservation?  | 100              | 0                |             |
| Is the timing very timely in order for you to still save biodiversity in the forest ecosystem?                          | 99.19            | 0.81             |             |
| <b>Average Rating</b>   | <b>99.39%</b>    | <b>0.61%</b>     |             |
|   | <b>Excellent</b> | <b>Very Good</b> | <b>Good</b> |
| How did you find our services for the training that was provided to you regarding biodiversity conservation in general? | 67.98%           | 25.28%           | 6.74%       |
| <b>No. of Respondents</b>   | <b>121</b>       | <b>45</b>        | <b>12</b>   |

The results of the evaluation and ratings on the three seminar-workshops conducted showed that the participants and audience were satisfied with the services provided in the various activities as evident in the average rating value of 99.39%. The services, in general, also obtained an excellent rating from 67.98% of the participants.

Evaluation and ratings of the “Green Technology (Botanical Pesticide)

Promotion and Field Demonstration” in Carranglan, Nueva Ecija; Baler, Aurora; and Balanga, Bataan are shown in Table 7.

**Table 7.** Evaluation and ratings of the green technology (botanical pesticides) promotion and field demonstration in the three study sites in Central Luzon.

| <b>Overall Rating</b>   |                  |                  |             |
|---|------------------|------------------|-------------|
| <b>Questions</b>  | <b>Ratings</b>   |                  |             |
|   | <b>Yes (%)</b>   | <b>No (%)</b>    |             |
| Are you satisfied for the green technology promotion provided to you?   | 97.50            | 2.50             |             |
| Is the green technology promotion adequate and complete?  | 76.06            | 23.94            |             |
| Did you get what you need to know about botanical pesticides as a green technology?   | 82.61            | 0                |             |
| Is the green technology promotion provided to you very timely in order for you to still use botanical pesticides in your farms? | 94.52            | 0.81             |             |
| <b>Average Rating</b>   | <b>87.67%</b>    | <b>6.81%</b>     |             |
|   | <b>Excellent</b> | <b>Very Good</b> | <b>Good</b> |
| How did you find our services for the promotion and field demonstration on botanical pesticide in general?                      | 32.76%           | 29.31%           | 37.93%      |
| <b>No. of Respondents</b>   | <b>38</b>        | <b>34</b>        | <b>44</b>   |

Based on the result of the evaluation and ratings on the three green technology promotion and field demonstrations conducted, it was found that the participants and respondents were also satisfied with the services provided for these promotional activities as can be gleaned from the average rating value of 87.67%. Overall, 32.76% of the respondents rated the promotional activities as excellent, 29.31% of them rated the activities as very good, and 37.93% of them rated the activities as good. The services rendered were rated only as good by the respondents perhaps because the project team was not able to immediately provide all the information they requested regarding the plants that could be used as botanical pesticides and the process of preparation and administration of the product because of intellectual property rights (IPR) and patent issues. However, the research team informed the local communities that they would be informed at once of the types of the plants and botanical pesticide products once they are already available.

## Evaluation of the IEC Materials Developed for Biodiversity Conservation and Green Technology Promotion in Central Luzon

Tables 8 to 10 show the results of the survey and evaluation of the comprehension, visual comprehensibility, attractiveness and preference, inducement to action, and impacts of the various IEC materials developed, produced, and published for biodiversity conservation and green technology promotion in Central Luzon.

**Table 8.** Ratings on the comprehension of the IEC materials.

| Comprehension  |         |        |
|--|---------|--------|
| Questions  | Ratings |        |
|  | Yes (%) | No (%) |
| Are the proposed messages and supporting information technically accurate?                                       | 92%     | 8%     |
| Do the proposed messages provide information for the target audience?  | 92%     | 8%     |
| Are proposed messages presented in logical order?  | 100%    | 0      |
| Does it look like information presented has been carefully chosen to convey only the most important information? | 100%    | 0      |
| Are the proposed messages used simple and easy to understand languages?  | 100%    | 0      |
| Is the written/spoken language appropriate?  | 100%    | 0      |
| Are the proposed messages easy to understand?  | 92%     | 8%     |
| Average Rating   | 96.57%  | 3.43%  |

Majority of the respondents answered positively with regard to the accuracy of the messages, provision of information, logical sequence of the topics, conveyance of the most important topics, and use of simple and easy words and messages for understanding and appropriate words for the various IEC materials.

Table 9 shows the results of the survey on visual comprehensibility, attractiveness, and preference of the IEC materials developed, published, and produced for biodiversity conservation and green technology promotion.

**Table 9.** Ratings on the visual comprehensibility, attractiveness, and preference for the IEC materials.

| <b>Visual Comprehensibility, Attractiveness, and Preference</b>                     |                |               |
|---|----------------|---------------|
| <b>Questions</b>  | <b>Ratings</b> |               |
|   | <b>Yes (%)</b> | <b>No (%)</b> |
| Do you like the pictures/graphics presented?  | 92%            | 8%            |
| Do you understand the pictures and graphics presented in the promotional materials? | 85%            | 15%           |
| Do the visuals correspond to what is being said in the text or narrative?           | 92%            | 8%            |
| Are the visuals appealing, not abstract or cluttered?                               | 92%            | 8%            |
| Do the visuals enhance rather than confuse the message?                             | 100%           | 0             |
| Do the graphics/photos illustrate the most important concepts?                      | 92%            | 8%            |
| <b>Average Rating</b>   | <b>92.17%</b>  | <b>7.83%</b>  |

Majority of the respondents were agreeable to the pictures and graphics presented for easy comprehension and understanding. Likewise, majority of them were in conformity that the visuals were appealing and illustrated the most important concepts whereas 100% of them were in accord that the visuals enhanced the messages of the IEC materials.

Table 10 shows the results of the survey on inducement to action and impacts of the IEC materials developed, published, and produced for biodiversity conservation and green technology promotion. Majority of the respondents (85%) were motivated to take actions to conserve biodiversity in their forest ecosystems because of the various promotional activities that the project had undertaken. Moreover, majority of them (92%) agreed that the IEC materials given to them were related to their daily tasks and were very useful to their environment. Moreover, 100% of the respondents were in conformity that the IEC materials were all very valuable to their social and economic lives.

**Table 10.** Ratings on the inducement to action and impacts of the IEC materials.

| <b>Inducement to Action</b>   |                |               |
|---|----------------|---------------|
| <b>Question</b>   | <b>Ratings</b> |               |
|   | <b>Yes (%)</b> | <b>No (%)</b> |
| Do these promotional materials inspire and motivate you to act and conserve the biodiversity? | 85%            | 15%           |

| <b>Impacts</b>   |                |               |
|--|----------------|---------------|
| <b>Questions</b>   | <b>Ratings</b> |               |
|  | <b>Yes (%)</b> | <b>No (%)</b> |
| Can the IEC material relate to your everyday tasks?            | 92%            | 8%            |
| Is the IEC material useful to your environment?                | 92%            | 8%            |
| Is the IEC material valuable to your social and economic life? | 100%           | 0             |
| <b>Average Rating</b>  | <b>94.67%</b>  | <b>5.33%</b>  |

Based on the results of the survey conducted to effectively educate people about biodiversity conservation, various sources of awareness and promotional campaign should be in the form of mass media. For home use, leaflets, flyers, and shirts are a few of the most effective media for awareness and promotional campaigns. Furthermore, social media like Facebook and mass media, to wit and posters, shirts, leaflets, and flyers are the effective tools for office and school use in promoting awareness of biodiversity conservation. Lastly, for community use, field demonstrations and seminar-workshops are effective sources of public awareness and information.

The various IEC materials which were developed, produced, published, and disseminated as well as the promotional activities conducted filled the gap on the general lack of knowledge about the importance of biodiversity conservation in the forest ecosystems. The IEC materials and campaigns are necessary to address biodiversity crisis because behaviors of individuals are significant for addressing the problem. Effective mass media campaigns are powerful vehicles for giving awareness and information to the public. Therefore, these IEC and promotional materials increased the knowledge of the local communities and other stakeholders with regard to biodiversity conservation, and these materials provided accessible up-to-date information on the status of biodiversity which can give guidance in their planning and decision making. Similar findings were obtained by various organizations that utilized IEC in their campaigns (Zimbabwe National Planning Council, 2010; Tanggol Kalikasan, 2004; IPM-CRSP, 2002). According to them, IEC proved to increase awareness, change attitudes and practices, and bring about a change in specific behaviors. The IEC materials also improved the general well-being of individuals and community by encouraging people to be responsible for their own actions through their own efforts.

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## **CONCLUSION**

Based on the various activities that were conducted and the different IEC materials and promotional campaign materials on biodiversity conservation and green technology particularly on botanical pesticides and phytoremediation that were prepared, developed, produced, and disseminated to indigenous people, local communities, LGUs, farmers, students, SDU multisectoral networks, and other institutional organizations, the IEC materials and other promotional campaign materials are very effective and important instruments for public awareness and education. Hence, they are very potent tools for biodiversity conservation and green technology transfer for possible adoption.

## **RECOMMENDATIONS**

Development of IEC materials should be done to enhance public awareness on the importance of biodiversity for better appreciation of and participation in conservation programs in other watersheds in Central Luzon.

The conduct of seminar-workshops and field demonstrations should be strengthened in other areas such as Carranglan Watershed, Baler Forest Reserve, Dibut River Watershed, and Bataan Natural Park to organize the local communities for meaningful participation in program activities and to train stakeholders on biodiversity and nature conservation.

## **ACKNOWLEDGMENTS**

We would like to express our heartfelt gratefulness to our funding agency, Philippine Council for Agriculture, Aquatic, and Natural Resources Research Development (PCAARRD), Department of Science and Technology (DOST), for the trust and confidence especially in our abilities to come up with significant outputs and in the accomplishment of the objectives.

We would also like to extend our deepest gratitude to the tribes of the Magbukon-aetas of Abucay, Bataan; Dumagat tribes of San Luis and Baler, Aurora; and Kalanguyas in Carranglan, Nueva Ecija and to the members of the barangay and tribal council of the different barangays included in the study areas for their assistance during the conduct of the study.

Most of all, we thank our Almighty God for His guidance and protection

as well as the wisdom He bestowed to us during the conduct of the research study and in the fulfillment of the project.

## **AUTHORS**

### **Annie Melinda Paz-Alberto**

University Professor and Director, Institute for Climate Change and Environmental Management, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines.

### **Shirly C. Serrano**

Faculty, Institute for Climate Change and Environmental Management, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines.

### **Roann P. Alberto and Janice Faye S. Ang**

Faculty, College of Business Administration and Accountancy, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines.

### **Daryl A. Juganas, Kathrina M. Mapanao, and Princess Joy C. Hernando**

Science Research Assistants, Institute for Climate Change and Environmental Management, Central Luzon State University, Science City of Muñoz, Nueva Ecija, Philippines.

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# Nutritional Composition and Antimicrobial Properties of Chili Pepper (*Capsicum* sp.) Leaves

**Riza Abilgos-Ramos, Amelia Morales,  
and Henry Mamucod**

*Rice Chemistry and Food Science Division  
Philippine Rice Research Institute, Maligaya  
Science City of Muñoz, Nueva Ecija,  
Philippines*

Nutrient content and antimicrobial properties of fresh and powdered chili pepper (*Capsicum* sp.) leaves were evaluated. Collected leaf samples were washed, oven-dried, and crushed to a fine powder. Nutritional analysis of fresh chili pepper leaves revealed high  $\beta$ -carotene ( $243.0 \pm 21.2 \mu\text{g}/100 \text{ g}$ ), iron ( $6.9 \pm 0.0 \text{ mg}/100 \text{ g}$ ), calcium ( $550.0 \pm 1.4 \text{ mg}/100 \text{ g}$ ), and dietary fiber ( $6.30 \pm 0.0 \text{ g}/100 \text{ g}$ ) contents. Dried and powdered sample resulted in concentration of  $\beta$ -carotene ( $32,151.0 \pm 1067.7 \mu\text{g}/100 \text{ g}$ ), iron ( $34.4 \pm 1.2 \text{ mg}/100 \text{ g}$ ), calcium ( $2270.5 \pm 6.3 \text{ mg}/100 \text{ g}$ ), and dietary fiber ( $27.3 \pm 1.4 \text{ g}/100 \text{ g}$ ). The water activity and moisture content of packed and stored for 10 dried and powdered leaves were  $<0.60$  and  $7.1 \pm 0.0\%$ , respectively. Chili pepper leaves showed good antimicrobial property against some pathogenic bacteria and fungi. Zone of inhibition was produced by ethanolic extract of chili pepper leaves against *Staphylococcus aureus*, *Salmonella* sp., *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Penicillium chrysogenum*, and *Fusarium oxysporum*. Results showed that chili pepper leaves are a significant source of  $\beta$ -carotene, iron, calcium, and dietary fiber that can be incorporated as a supplementing ingredient in different food products or preparations. Chili pepper leaves as a food ingredient are a substantial source of micronutrients. Dried and powdered form can be incorporated in many food preparations.

**Keywords:** antimicrobial properties,  $\beta$ -carotene, calcium, chili pepper leaves, dietary fiber, iron

## INTRODUCTION

Plants are the main dietary sources of iron, vitamin A (in the form of  $\beta$ -carotene), and folate for people in the rural areas of developing countries. Being micronutrient-dense, incorporating them in food or dishes as ingredients is a way to ensure supply of essential nutrients in the diet. Green leafy vegetables are rich in micronutrients such as  $\beta$ -carotene, folate, and iron (Ng, Chye, & Ismail, 2012; Gupta & Prakash, 2011). By consuming these indigenous vegetables, nutritional security can be cheaply achieved (Gupta, Jyothi Lakshmi, Manjunath, & Prakash, 2005; Afolayan & Jimoh, 2009) and sustained.

Chili pepper (*Capsicum* sp.) is widely cultivated in the Philippines. With 787 hectares harvested to chili pepper in 2011, the average volume of production in the country is 1698 metric tons (BAS, 2012). As a popular ingredient in Asian cuisine, its leaves are usually added in a chicken ginger stew with unripe papaya. The green grassy herby aroma of chili pepper leaves (CPLs) gives the dish its distinct taste. Chili pepper leaves impart milder heat and pungency in foods in comparison with that of the fruit. A CPL contains a significant amount of  $\beta$ -carotene and iron even in cooked form (FNRI, 1997) and capsaicin (C<sub>18</sub>H<sub>27</sub>NO<sub>3</sub>), which has therapeutic properties (Yaldiz, Ozguven, & Sekeroglu, 2010). A substantial amount of lutein and chlorophyll is also found in the leaf (Kim, Ahn, Lee, Moon, Ha, & Kim, 2011). With its good nutritional profile, a CPL is a good candidate for ingredients in different food preparations. However, because of the lack of information and appropriate technology, the utilization of CPLs is not fully maximized. This underutilized vegetable is highly perishable because of high moisture content. Without refrigeration, it gets easily damaged, wilted, or rotten right after harvest. The need to process this agricultural crop into a more stable and practical form is therefore necessary. This study was conducted to process CPLs into crushed and powdered forms using previously optimized oven-drying method and evaluate its nutritional profile in fresh and powdered forms, shelf life, and antimicrobial property.

## MATERIALS AND METHODS

### Collection and processing of chili pepper leaves into crushed and powdered forms

Fresh CPLs (var. Taiwan hybrid) were collected from Sto. Domingo, Nueva

Ecija, Philippines. A total of 11 kg of fresh leaves were thoroughly washed under running water in the laboratory. Unhealthy leaves were discarded. The leaves were rinsed twice with distilled water, laid in trays, and air-dried for several minutes. After which, the leaves were oven-dried at 40 °C for 12 h. One part of the dried leaves was crushed manually to produce crushed form. The other part was crushed and passed through a 425- $\mu$ m mesh sieve to obtain powdered form.

### **Analysis of nutrients in fresh and powdered CPL**

Nutritional composition was determined by measuring the moisture content (MC), dietary fiber (DF),  $\beta$ -carotene, vitamin C, calcium, and iron content of fresh and powdered chili pepper leaves. Calcium and iron were determined by dry ashing and measured by inductively coupled plasma spectrometry (AOAC 2005 method 927.02 and 999.11).  $\beta$ -Carotene was extracted through saponification and quantified by high performance liquid chromatography (AOAC 2005 method 941.15). Total dietary fiber was measured by enzymatic-gravimetric (AOAC 2005 method 992.16) and vitamin C by Luff-Schoorl titrimetry (AOAC 2005 method 967.21).

### **Moisture content determination**

The MC of the sample was determined by oven-drying method. Approximately 1.0 g of sample was weighed in tared aluminum pan. The pan was placed in an oven at a temperature of 105 °C for 5 h. After drying, the samples were removed from the oven and placed into a dessicator for 30 min. After which, the samples were weighed and placed back again into the oven until constant values were obtained. Percent moisture was calculated as:

$$\% \text{ Moisture} = \frac{\text{wt. of sample before drying} - \text{wt. of sample after drying}}{\text{wt. of sample before drying}} \times 100$$

Determination of physicochemical properties and microbial load

### **A<sub>w</sub> measurement**

The A<sub>w</sub> of the samples was determined using a barium chloride-calibrated LuftDurotherm Wert-Messer No. 5803 A<sub>w</sub> meter. Around 5.0 g of sample was placed and spread evenly to cover the bottom of the sample container.

The sensor head was secured tightly and was left for 2.5 h at  $24 \pm 1$  °C. Reading was done by viewing the meter of the sensor head.

### **Microbial load evaluation**

Total plate and mold counts were monitored monthly by pour plate technique (Fernandez, Dalmacio, Raymundo, Zamora, & Mendoza, 2008). One gram of the sample was mixed with 9 mL of 0.1% peptone solution. Successive dilutions were made by transferring 1 mL of the suspension medium to 9 mL of 0.1% peptone solution. One milliliter of the diluted samples was transferred in petri plates and poured with Standard Plate Count Agar for total plate count and Potato Dextrose Agar (PDA) for mold count determinations. Plated samples were incubated at 30 °C, and colonies were counted after 24 to 48 h.

### **Shelf life determination**

The crushed and powdered chili pepper leaves were stored in sealed 0.07-mm PE and 0.07-mm aluminum-coated bags and kept at ambient temperature (26–28 °C). The moisture content, water activity, and microbial load were monitored every other month up to 10 months of storage.

## **ANTIMICROBIAL PROPERTY**

### **Plant extraction**

About 33.31 g of powdered leaves were soaked with 500 mL of 80% ethanol for 48 h. The sample was filtered under suction through ordinary filter paper using a Buchner funnel. The supernatant was concentrated through rotary vacuum evaporator at 60 °C and 70 cm Hg to remove the ethanol. The concentrated extract was stored in amber bottle at 4 °C until analyzed.

### **Test microorganisms**

Foodborne and/or human pathogens such as *Escherichia coli*, *Pseudomonas aeruginosa*, *Salmonella* spp., *Bacillus subtilis*, and *Staphylococcus aureus* were used as bacterial test microorganisms and maintained in Nutrient Agar (NA) slants. Whereas, *Aspergillus niger*, *Fusarium oxysporum*, and *Penicillium*

chrysoygenum were used as fungal test microorganisms and maintained on PDA slants. The cultures were obtained from the National Collection of Microorganisms of the National Institute of Molecular Biology and Biotechnology, University of the Philippines Los Baños, Laguna, Philippines.

### **Antibacterial activity**

Antibacterial activity of the CPL extract was evaluated by paper disc diffusion method (Doughari & Pukumams, 2007). Filter paper discs (6 mm) were dipped into CPL extract for about 10 sec, and excess extract was drained off. A disc soaked in 80% ethanol was also prepared for the negative control. The discs were then oven-dried at 30 °C for about an hour. For the meantime, 24-h bacterial cultures were adjusted to 0.5% McFarland standard and inoculated onto NA plates. The disc which approximately contained 10 to 15 µL of extract was placed and gently pressed down onto the surface of the inoculated NA plates. Paper discs of standard antibiotics namely: 10-µg ampicillin, gentamycin, and streptomycin and 30-µg tetracycline were used as the positive control. The plates were then incubated upside down at 37 °C, and the zone of inhibition around each paper disc was measured with a ruler after 24 h.

### **Antifungal activity**

Antifungal property of CPL extract was evaluated following the method of Ferdes, Ungureanu, Radu, and Chirvase (2009) with some modifications. A loopful of 48-h fungi was inoculated at the center of the acidified PDA plate and then incubated upside down at 30 °C for 48 h. For the meantime, 1.0% of CPL extract was mixed into acidified PDA (experimental), then distributed in plates and was allowed to solidify. The PDA plate without extract was served as the control. A piece of peripheral fungal growth from the acidified PDA plate was obtained and transferred in the experimental and control plates. The plates were then incubated at 30 °C, and the colony diameter was measured using a ruler after 5 days. Percent inhibition ratio was then calculated as:

$$\text{Inhibition ratio (\%)} = \frac{\text{colony diameter in control plate} - \text{colony diameter in experimental plate}}{\text{colony diameter in control plate}} \times 100$$

## STATISTICAL ANALYSIS

All analyses were conducted in duplicates. The ANOVA and subsequent comparison of means using Tukey's HSD (honestly significant difference) were determined using SAS statistical software v. 9.1 (SAS Institute, Cary, NC, USA) at  $p < 0.05$ .

## RESULTS AND DISCUSSION

Percent recovery of powdered and crushed CPL from fresh sample is presented in Table 1. The high MC (75.41%) of the fresh leaves resulted in considerably low recovery of dried leaves. Only 24.81% of crushed and 21.15% of powdered sample were produced from fresh leaves.

Table 2 presents the baseline nutritional profile of fresh and powdered CPL. The drying process resulted in concentration of nutrients of CPL.  $\beta$ -Carotene content was 32,151.0  $\mu\text{g}/100\text{ g}$  which will have beneficial effect on vitamin A status if fat (such as cooking oil) will be used in food preparation as fat enhances carotenoid absorption for bioconversion to vitamin A (Jayarajan, Reddy, & Mohanram, 1980). Addition of 0.5% powdered chili pepper leaves in salt bread showed significant increase in folate, iron, and  $\beta$ -carotene (Abilgos-Ramos, Manaois, Morales, & Mamucod, 2015). High beta-carotene from green leafy vegetables (drumstick leaves) was observed to reduce total cholesterol and control triglyceride levels in rats (Oinam, Urooj, Phillips, & Niranjana, 2012). Vitamin C in powdered CPL was 28 mg/100 g, calcium was 2,270.5 mg/100 g, and iron was 34.4 mg/100 g. Dietary fiber content (27.3 g/100 g) was also considerably high. The high amount of DF is helpful in lowering low-density lipoprotein and total cholesterol levels, prevention of cardiovascular diseases, and improvement in digestive health. From these results, a CPL as dietary source of minerals and vitamins is of particular importance. However, the high fiber content may affect the bioavailability of the iron unfavorably (van Jaarsveld, Faber, van Heerden, Wenhold, van Rensburg, & van Averbeke, 2014). Nevertheless, chili pepper leaves in powdered form can be used as supplementing ingredient in food products or preparations with little nutritional value (e.g., rice crackers).

Initial MC of crushed CPL was significantly higher than that of powdered form. However, on the 8th until 10th month of storage, the MCs of the samples were comparable regardless of form and packaging material

(Table 3). Surprisingly, increase in moisture content from 3rd-to-8th-month storage was noted in all samples which can be explained by permeability of PE material used but needs further investigation for samples packed and stored in aluminum-coated material. The  $A_w$  of all samples generally remained stable throughout the storage time with only slight changes on the 2nd until 6th month of storage. This indicates good product storability (Table 4) as dried products with MC ranging from 5 to 15% and  $A_w$  below 0.6 have good storage stability and are less susceptible to microbial spoilage (deMan, 1999).

In terms of microbial load, powdered samples had significantly lower initial total plate and mold counts compared with crushed samples. As the storage time progressed, no significant trend was observed between the treatments. However, the microbial counts of all samples significantly dropped after two months of storage (Figures 1 and 2). Based on the standards of the World Food Program of the United Nations (UN, 2009), the values were within acceptable limits ( $<10 \times 10^4$  cfu/g for TPC and bacterial count and  $<1000$  cfu/g for mold count). Low MC and  $A_w$  might have been responsible for the low microbial growth. Also, Fernando, Ligia, Mayra, and Ignacio (2011) reported that CPLs contain antimicrobial peptides (AMPs) that might have inhibited microbial growth during storage. The AMPs are small rich cysteine peptides with biological activities of inhibiting bacterial and fungal growth.

In order to evaluate the antimicrobial activity of CPL, ethanolic extract of the leaves were screened against common foodborne pathogenic bacteria and fungi. The highest inhibition (14.75 mm) produced by CPLs was observed against *Staphylococcus aureus*. On the other hand, the least inhibition (8.50 mm) was seen against *Bacillus subtilis*. The inhibitory property of CPLs was comparable with that of streptomycin against *Pseudomonas aeruginosa* (Table 5). Cichewicz and Thorpe (1996) found that the plain and heated extracts of *Capsicum* species were also found to exhibit varying degrees of inhibition against *Bacillus cereus*, *B. subtilis*, *Clostridium sporogenes*, *Clostridium tetani*, and *Streptococcus pyogenes*. In terms of fungal inhibition, CPLs had a significant effect against *Penicillium chrysogenum* (37.61%). The least inhibitory effect (1.62%) was observed against *Aspergillus niger* (Table 6).



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## CONCLUSION

Processing of CPLs into dried and powdered supplement resulted in concentration of its nutrients and product stability. Results also showed that CPLs had comparable nutritional value (vitamin C, calcium, iron, dietary fiber, and  $\beta$ -carotene) with the more popular moringa leaves. Both aluminum-coated and polyethylene plastic pack containers provided good storability of crushed and powdered CPL in terms of MC, Aw, and microbial load for 10 months. However, CPLs showed moderate antimicrobial property against certain pathogenic bacteria. The use of other solvents for CPL extraction and increase in the concentration for antimicrobial property must be investigated. This study provides evidence that CPLs are a significant source of micronutrients such as iron,  $\beta$ -carotene, and calcium. With this information, chili pepper leaves can be used as a supplementing ingredient in food products or preparations. Development of nutritional information per serving size of the developed supplement is recommended. The market potential of the powdered product must also be considered to determine the consumer perception and acceptance of the product. The use of other nutrient-dense green and leafy vegetables such as alughati (*Basella alba*) as supplement must also be explored. Increased utilization of CPLs can boost its agricultural production and may subsequently improve the economic status of farm families.

## ACKNOWLEDGMENT

The authors are grateful to Mr. Ramon Garcia for the chili pepper leaves.

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**Table 1.** Percent recovery of crushed and powdered chili pepper leaves.

| Form of Chili Pepper Leaves    | Recovery after drying |             |
|--------------------------------|-----------------------|-------------|
|                                | Weight (g)            | Percent (%) |
| Oven-dried                     | 57.97                 | 28.99       |
| Crushed                        | 49.61                 | 24.81       |
| Powdered                       | 42.30                 | 21.15       |
| Fresh (initial weight) = 200 g |                       |             |

**Table 2.** Nutritional composition of fresh and dried chili pepper leaves.

| Analytes                | Form of Chili Pepper Leaves |                  |
|-------------------------|-----------------------------|------------------|
|                         | Fresh                       | Dried/powdered   |
| Moisture, %             | 75.71 ± 0.24                | 7.14 ± 0.04      |
| Dietary fiber, g/100 g  | 6.30 ± 0.04                 | 27.27 ± 1.41     |
| Beta Carotene, µg/100 g | 243.00 ± 21.21              | 32,151 ± 1067.73 |
| Vitamin C, mg/100 g     | 3.00 ± 0.01                 | 27.62 ± 0.04     |
| Calcium, mg/100 g       | 550.00 ± 1.41               | 2270.50 ± 6.36   |
| Iron, mg/100 g          | 6.87 ± 0.01                 | 34.36 ± 1.22     |

**Table 3.** Moisture content (%) of crushed and powdered chili pepper leaves during storage.

| Form of CPL and Packaging Material | Month of Storage |          |         |          |         |         |
|------------------------------------|------------------|----------|---------|----------|---------|---------|
|                                    | 0                | 2        | 4       | 6        | 8       | 10      |
| Crushed, Aluminum coated           | 7.44a,C          | 7.23ab,C | 8.62b,B | 8.81c,AB | 8.99a,A | 6.65a,D |
| Powdered, Aluminum coated          | 7.12b,B          | 6.85cb,B | 8.27c,A | 8.47d,A  | 8.90a,A | 6.61a,B |

|              |         |          |         |           |         |         |
|--------------|---------|----------|---------|-----------|---------|---------|
| Crushed, PE  | 7.44a,C | 7.51a,C  | 9.04a,B | 9.35a,A   | 9.37a,A | 7.10a,D |
| Powdered, PE | 7.12b,C | 7.10bc,C | 8.69b,B | 9.06b,AAB | 9.14a,A | 6.91a,C |

Mean values with different small letters in the same column and capital letters in the same row are significantly different ( $p < 0.05$ ).  $n = 2$ .

**Table 4.** Aw of crushed and powdered chili pepper leaves during storage.

| Form of CPL and Packaging Material | Month of Storage |           |         |          |         |         |
|------------------------------------|------------------|-----------|---------|----------|---------|---------|
|                                    | 0                | 2         | 4       | 6        | 8       | 10      |
| Crushed, Aluminum coated           | 0.45a,AB         | 0.51c,AAB | 0.56a,A | 0.55ab,A | 0.54a,A | 0.56a,A |
| Powdered, Aluminum coated          | 0.42a,AB         | 0.54b,A   | 0.57a,A | 0.54ab,A | 0.54a,A | 0.54a,A |
| Crushed, PE                        | 0.45a,A          | 0.50c,A   | 0.56a,A | 0.57a,A  | 0.56a,A | 0.56a,A |
| Powdered, PE                       | 0.42a,AB         | 0.57a,A   | 0.52a,A | 0.53b,A  | 0.58a,A | 0.59a,A |

Mean values with different small letters in the same column and capital letters in the same row are significantly different ( $p < 0.05$ ).  $n = 2$ .

**Table 5.** Zones of inhibition produced by chili pepper leaves and reference antibiotics against commonpathogenic bacteria.

| Test Bacteria          | Zone of Inhibition (mm) |              |            |              |            |
|------------------------|-------------------------|--------------|------------|--------------|------------|
|                        | CPL                     | Tetracycline | Gentamycin | Streptomycin | Ampicillin |
|                        | extract                 | (30 ug)      | (10 ug)    | (10 ug)      | (10 ug)    |
| Bacillus subtilis      | 8.50c,D                 | 39.75b,B     | 32.00a,C   | 28.75a,C     | 46.75a,A   |
| Escherichia coli       | 12.75b,C                | 46.25a,A     | 30.00a,B   | 31.25a,B     | 44.00ab,A  |
| Pseudomonas aeruginosa | 12.25b,C                | 50.50a,A     | 31.00a,B   | 17.00c,C     | 46.25a,A   |
| Staphylococcus aureus  | 14.75a,D                | 36.75b,B     | 30.00a,C   | 30.00a,C     | 49.00a,A   |
| Salmonella sp.         | 12.75b,D                | 36.00b,A     | 29.75a,B   | 23.00b,C     | 37.75b,A   |

Mean values with different small letters in the same column and capital letters in the same row are significantly different ( $p < 0.05$ ).  $n = 2$ .

**Table 6.** Percent inhibition of chili pepper leaves against common pathogenic fungi.

| Test Fungi              | Average Colony Diameter (mm) |              | Inhibition (%) |
|-------------------------|------------------------------|--------------|----------------|
|                         | control                      | experimental |                |
| Aspergillus niger       | 46.25                        | 45.00        | 1.62b          |
| Fusarium oxysporum      | 21.00                        | 16.50        | 21.50ab        |
| Penicillium chrysogenum | 13.25                        | 8.25         | 37.61a         |

Mean values with different small letters in the same column and capital letters in the same row are significantly different ( $p < 0.05$ ).  $n = 2$ .

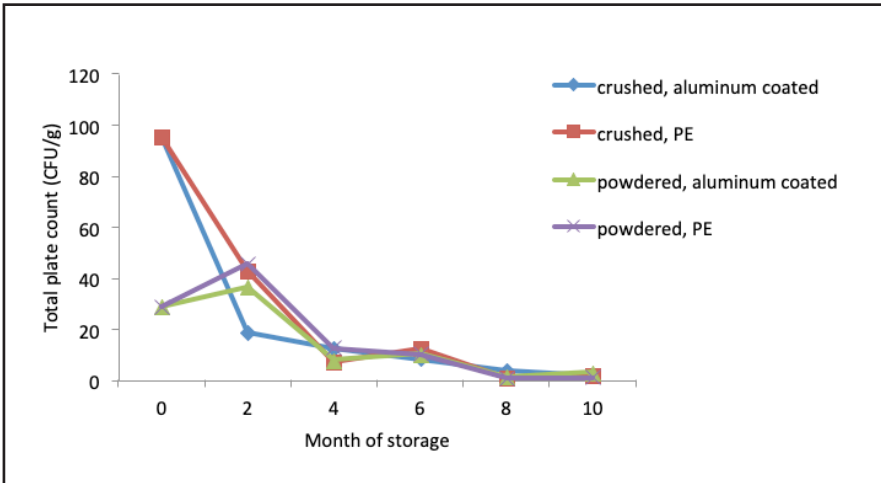


Figure 1. Total plate count of chili pepper leaves during storage (cfu/g).

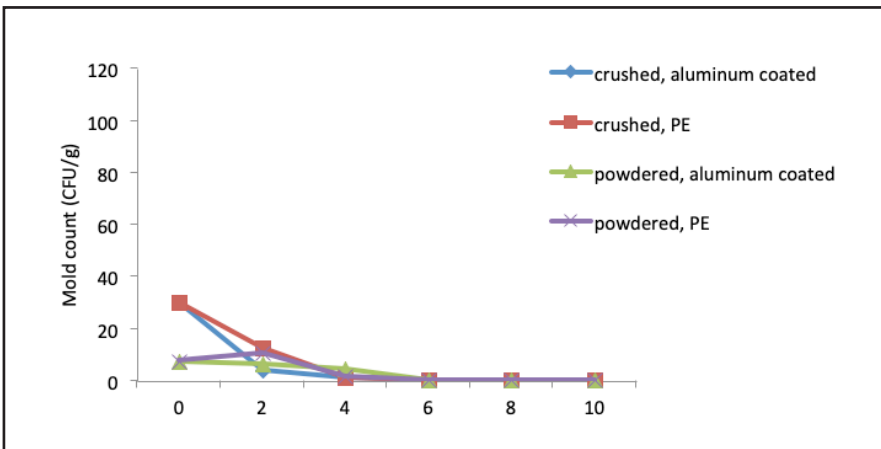


Figure 2. Mold count of chili pepper leaves during storage (cfu/g).

## **Horror Fiction and the Rhetoric of Release in *Waking Up the Dead and Other Horror Stories***

Ivane R. Mahinay

We live in an increasingly known world. Every day gives way to numerous new discoveries and innovations in diverse fields of knowledge. Man is slowly gaining mastery of his own biology and that of his world; he has even expanded his reach to the heavens and the rest of the cosmos. We have theories as to how the world began, we have technologies that shape the future, and we like to believe that we wield power over every second we have, every space imaginable, if only because we know more and know better.

And so one would think that, in a world where the mysteries of life are unraveled little by little everyday, no space remains for inexplicable horrors and unnamable dreads. But as the nightly news reminds us, these terrors remain, and as the book at hand demonstrates, art is where we are offered refuge from the unspeakable things that haunt us at a day and age when, we reason, they should not anymore.

*Waking the Dead and Other Horror Stories* is a short story collection by Filipino writer Yvette Tan. Published in 2009 by Anvil Publishing, the book contains ten stories written as early as the 1990s, most of them previously published in various anthologies, magazines, and the occasional broadsheet (Albano, n.d.; Rocket Kapre, n.d.). Two of the stories, “Kulog” and “Sidhi,” have won the Palanca Awards, while the stories “Stella for Star” and “The

Bridge” have won the Philippine Graphic Fiction Awards (Albano, n.d.). All the stories, of course, deal with horrors not always supernatural and are set in a reimagined past, a parallel present, or a projected future—but all are recognizably Filipino, from the beliefs and rituals that inform the stories to the concerns and societal ills they try to grapple with and resolve.

Of course, the claim that literature is shaped by the circumstances of its creation and, in turn, shapes the responses of the reader is not new. A quick perusal of any old textbook of literary theory and criticism would show how most of it is concerned with exactly this, matters of history, politics, and psychology. This is, however, an especially crucial concern in the study of the horror genre, a genre characterized primarily by the affect it seeks to evoke in the reader (Hartwell, 1987), as well as being a genre that enjoys immense popularity in whichever medium it is rendered in, be it cinema or literature. That popular culture is both a medium of domination and representation, that is to say, that it both enables the continuous “reproduction of the prevailing social system” while also representing a society’s needs and desires, even those from the very bottom (Rivkin & Ryan, 2004), gives horror’s uniquely affective nature a new dimension. We now begin to wonder, with horror being so popular, can it serve as a vehicle for something more than just entertainment, something perhaps more socially significant?

Trauma studies scholars Adam Lowenstein (2005) and Linnie Blake (2008) both answer in the affirmative, arguing that the horror genre, specifically horror cinema, has an especially important role in society by addressing within its confines grave historical trauma such as wars and genocide, in the process providing, for Lowenstein, an alternative to the national narrative and, for Blake, the chance for recovery. This certainly echoes what Thomas Fahy, in his introduction to *The Philosophy of Horror* (2010), deems the cathartic and moral aspects of the genre—that horror fiction lets us confront our deepest fears in a controlled space where we are always assured victory, all the while raising complex questions on justice, violence, and suffering.

In connection to trauma, yet another relevant field to the study of the genre is psychoanalysis. The ties between horror and psychoanalysis span back to the latter’s very beginnings, in Freud’s work on the uncanny, discussed below, to other works by Marie Bonapartes, Otto Rank, and Ernest Jones (Dodds, 2011).

In our very own Philippines, brushes with horror narratives occur early on, from the legion of terrifying creatures, mythological or real, that adults like to scare children into obedience with, to the vivid imagery of the devil for the predominantly Christian population, to the countless ghost stories exchanged and passed on by generations and generations of schoolchildren. Sadly, while there is a rich tradition of horror in the country, there is a dearth in the scholarship and archiving for it. One may hypothesize why this is so: it could be attributed to the divide many academics place between ‘high’ and ‘low’ cultures, with only the former being worthy of serious academic consideration; or it may be that horror as a narrative is so deeply enmeshed in the fabric of Filipino life, from religious imagery to folklore to urban legends to popular culture that its pervasive presence is taken for granted. Of the few pieces of scholarship readily available that make mention of horror fiction, Anna Felicia C. Sanchez’s (2010) study on Philippine speculative fiction and Rolando B. Tolentino’s study of the *Shake, Rattle, and Roll* franchise (2016) both articulate points particularly relevant to this paper’s aim to examine the ties between context and horror, horror and audience.

Sanchez (2010) does not consider all of horror fiction to be under the scope of speculative fiction, since the element that best characterizes speculative fiction is its use of the “fantastic, strange, or unreal,” an element not always used in horror. The important takeaway from this essay is that, while speculative fiction characteristically resists allegory, it does have the potential to transgress its Western roots by tackling issues of nation, class, and gender. Tolentino (2016), meanwhile, mirrors Lowenstein and Blake’s assertion of the relationship between horror films and national identity and history. For these critics, horror cinema serves as allegory for national, historical trauma. The horrors of the Marcos regime, for instance, can be felt in *Shake, Rattle, and Roll’s* first installment, particularly the segment directed by Lino Brocka. So, too, the horrors of the Arroyo and Aquino administrations are reflected in *Shake, Rattle, and Roll 12*, as well as myriad issues of women, capitalism, and natural disasters. Tolentino further argues that the restaging of these traumas “allows for participants and audiences to reimagine an alternative social and historic reality—the staging of the means and conditions of their freedom” (p. 17).

While not overtly allegorical nor political, Yvette Tan’s *Waking the Dead and Other Horror Stories* definitely discusses pressing concerns in our



immediate environs, from environmental to moral to social issues, and by extracting their inherent horrors and vanquishing them on paper provides its readers release no matter how temporary.

The collection begins with the story “The Child Abandoned,” previously published in *Philippine Speculative Fiction Vol. II* and *Usok #1* (Rocket Kapre, n.d.). The story is set in an alternative Quiapo in which The Change has occurred. Some time ago, a child, Teresa, was born in the middle of a storm, amidst the rising filthy water of the Ilog Pasig. This seemed to endow her with a certain strangeness—for instance, the river would calm her as a baby and as she grew older she would talk to the river and drink its murky water. The river did not seem indifferent to her either—its water would rise higher the more she talked to it. Eventually, during another huge storm, the river reclaims Teresa, letting her body absorb all the river’s sickness, restoring it to its pristine state and also opening the door between the mortal realm and the Other Country where supernatural beings live. Diwatas and other mythological creatures then descend upon Quiapo, where they can still be found until the story’s imaginary, parallel present. Teresa, meanwhile, is canonized Sta. Teresa the Child Abandoned, and her spirit moves on to the Other Country in which she has important work to do, after which work she will come back to Quiapo, to the family that waits for her, with nothing to support their hope save a lock of hair that continually grows even as its owner has already, at least in this world, died.

Following David G. Hartwell’s (1987) classification of horror fiction, the story follows the moral allegorical mode which deals with the “intrusion of supernatural evil into consensus reality,” which supernatural intrusion fulfills the audience’s desire for the “attribution of a moral calculus (usually teleological) deriving from ultimate and metaphysical forms of good and evil behind events in an everyday reality” (p. 8). The idea of a “supernatural evil” in the story is tempered by the theme of the abandoned child often used in gothic horror. The image of the abandoned child represents our ambivalent attitudes towards children especially in the Romantic and Victorian eras, when children were seen as both innocent and in need of enculturation to prevent them from destroying adult order (Cavallaro, 2002). In the story, we are presented an ordinary world, the Quiapo as we know it into which the spirit of the river intrudes through the person of Teresa. Teresa, consistent with the gothic motif of the abandoned child, not only represents the innocent past in which the world was clean and untainted but also

represents the “primordial chaos” in which man was subjected to powerful and unreasoning Nature’s whims and wills. Thus, she is not completely evil, as she does restore the river’s health, but she had to do so through a violent death after a violent storm and moreover brings upon Quiapo the supernatural beings of the Other Country. Still, however morally ambiguous she is, Teresa, and the powerful river which she represents, remains the ultimate force behind the “evil” that does overtake the story. This is in keeping with the conventions of the moral allegory—but more than that, it is what provides the reader psychological release in the story. Yes, this story tackles the very real horror of environmental decay, but this is also an acquittal of man and his hand in bringing about nature’s destruction. In the story, it is made very clear that it was the factories that fouled up the river in the first place, but nowhere in the story is man or capitalism reprehended. Instead, the responsibility of destroying and making the world right again is attributed to Nature, in the process absolving the reader of the guilt of having destroyed the environment.

Like the previous story, “The Bridge” is also a reimagining, this time of a historical event, the construction of the San Juanico Bridge. An elegant lady called Madame—Imelda Marcos, obviously—arrives in the small town where Dab and her family live. The first lady is here to oversee the construction of the bridge, bringing with her a strange boy named Ronnie. Dab’s father is hired to work on the bridge while her mother and her sister are hired to work in Madame’s mansion. Dab accompanies them to the mansion and, being special herself, senses something strange in the house and with the Madame. Eventually, she intuits that the Madame is planning something with regard the bridge<sup>1</sup> which scares her so much that she does not go back to the mansion again. Circumstances force her to, though, when Madame sends her goons to fetch her, threatening to hurt her family if she refuses to go. Apparently during the bridge’s construction, the child of Tarabusaw, the spirit inhabiting the San Juanico Strait, was killed, and Tarabusaw has exacted revenge by making the vain Madame ugly. To be appeased, the spirit asks for Dab in exchange for the child’s life that was lost. In the end, Madame, again, threatens to hurt Dab’s family, and so in exchange for their safety and prosperity, Dab agrees to join Tarabusaw in the waters of San Juanico.

The historic horror presented here is the Martial Law era and the cruelties that Ferdinand Marcos and his wife inflicted upon the country. The

trauma of that era is rendered not only through Madame's repeated threats to Dab but also by the absent but alluded to urban legend of the San Juanico Bridge's blood-soaked foundations. In the story and in the urban legend, Madame is depicted as an evil schemer who is willing to sacrifice the lives of children and Dab's family in the service of her own vanity masqueraded as patriotism. However, this terror is subverted and conquered by turning Madame into a pathetic victim, into the oppressed herself, at the mercy of none other than a child, the very people she supposedly had had killed to build the bridge. Her power and the horror it has wreaked upon the nation and history are, in this story, presented without its usual accompanying sublimity. The power she borrows from Ronnie to power her toy telephone with the picture of a clown renders that power silly and ridiculous; the power she uses in the last few pages of the story to terrorize Dab is not the power wielded by the mighty but that of the desperate. By flipping the power dynamics between the historical oppressor and the oppressed, the story provides relief to this "wound" of our nation, as Blake would put it. Alternatively, reading it against the conventions of moral allegory, the appearance of Tarabusaw and his conquering of the First Lady through Dab can be seen as the oppressor falling prey to the supernatural forces, particularly Nature, underpinning our world.

"Waking the Dead," the collection's titular and fifth story, is this time a flash fiction in which the supernatural in the form of the undead intrude upon reality. The protagonist, Gorio, has finally finished deciphering a scroll he has been working on for 57 years. The scroll contains a spell that wakes the dead, so to speak, and he does this so he can be reunited with his family—Maritess, the love of his life, and their child. "Stella for Star," meanwhile, is a story about a gay couple, Dorian and Paco, who one day finds a baby at their doorstep. They decide to adopt the baby and name it Stella, for star. Stella, however, turns out to be a *tiyanak*, a malevolent creature that takes the form of a baby in order to attract unwary travelers, whom it then attacks (Wikipedia, 2016). While Stella feels affection for and abstains from hurting Dorian, her caretaker, the same cannot be said for everyone else. Her gustatory preferences progress from blood to fresh meat, to rats and stray dogs and cats, to a three-year-old, and to finally, her Papa Paco when he makes her beloved Papa Dorian cry. With his lover dead, the story ends with Dorian setting fire to the house and all three of them.

What these two stories have in common, besides their supernatural

element, is that both contain manifestations of what Freud calls the uncanny, “that species of the frightening that goes back to what was once well known and had long been familiar.” The uncanny “can take the form of either ‘repressed’ or ‘surmounted’ beliefs or desires which are brought up from the unconscious into the conscious mind,” with the reappearance of surmounted beliefs resulting in what Curtis Bowman calls “the loss of intellectual mastery” (LeDrew, n.d.). Perhaps, one of the most common surmounted beliefs is the belief that the dead can come back to life and the belief in the double, “a psychological invention which provides infants with insurance against the threat of death and/or the destruction of the ego” (Schneider, 1999). In “Waking the Dead,” for instance, this surmounted belief resurfaces and is reconfirmed when Gorio successfully casts the spell and the dead does come back to life. It is the same in “Stella for Star,” when the double takes the form of the *tiyanak*, who is both innocent baby and malevolent monster. These metaphors of surmounted beliefs, though frightening, are, however, still pursued by Gorio and Dorian. As Dodds (2011) asserts, dread and desire are inextricably linked, and we are irresistibly drawn to the objects we fear. However, the superego, the part of the psyche that has internalized cultural rules, tries to stop us from fulfilling these harmful desires (Siegfried, 2014). In Gorio’s case, for example, the fulfillment of desire brings a whole barrage of the dead back to life; in Dorian’s, it costs him his family. Still, these characters pursue these objects of horror, thereby expressing and fulfilling these desires for us on paper and as such releasing us from their grip in real life.

The danger of going after what the superego represses is also the theme of the last story of the collection, “Sidhi.” Sidhi, defined by the narrator as “intensity [...] but so much more,” as “heat and passion and hunger rolled into one” (Tan, 2009, p. 145), is a state of consciousness reached through a variety of means: through the similarly-named drug or through the Dreamer, Noah, who is able to dream dreams full of sidhi, mimicking the hallucinogenic effects of the drug and passing on these effects to anyone in contact with him. In a society addled by tendencies to addiction, both the drug and Noah grow to immense popularity. This rise to fame is witnessed by the narrator, his consort, and on the feast day of Sta. Teresa the Abandoned; he stages a mass dreaming/trance session in which he intentionally introduces paranoia and other side effects so as to kill the narrator. This is both punishment and warning to her, who earlier

was involved in an aborted drug session with her friends, the Siamese twins Yna and Angelo. Noah disapproves of her use of the drug Sidhi as it makes him feel inadequate. In the end though, she experiences a final, authentic “high” this time from Sta. Teresa when she kisses a saint-touched girl and drinks Sta. Teresa’s water from her lips.

The horror tackled here is that of addiction and the hedonistic attitude that gives way to such a problem—that is, when the unconscious/id, which is concerned with the fulfillment of pleasure alone, is given free rein instead of being policed by the superego (Siegfried, 2014). The id here is represented by Noah, who gives expression to the pleasure drive of the people. The horror of this is taken to the extreme when the narrator finally experiences the side effects of the high she gets from Noah’s trance. However, consistent with the moral allegory as defined by Hartwell, the righting of the world is performed by a metaphysical, supernatural being, Sta. Teresa. Similar to the stories “Waking the Dead” and “Stella for Star,” the story articulates the reader’s repressed desires on paper, but unlike the previous two, wish-fulfillment is portrayed ambiguously here: artificially contrived transcendence is portrayed negatively, while authentic transcendence effected through desire is portrayed as more positive and long-lasting. In this manner, both impulses for hedonism and for the repression of hedonistic desires are fulfilled where they are not in real life, and the reader is satisfied.

Two other stories employ the supernatural in its rendering of the horrific, the penultimate story, “Daddy,” and the Palanca Award-winning story, “Kulog.” The former is about a character named Yvette Tan who receives not one but three calls from her dead father who bids her not to forget everything. The latter is a story about a *kapre* named Kulog who terrorizes the house next to his tree. One day, a new family moves in. The child, a skinny girl full of bruises whose name is Angela, befriends Kulog, and Kulog, in turn, tries to help her by retrieving the bear Angela’s father made her get rid of and by performing a prank on her cruel father. When the father wakes up and discovers this, he wreaks havoc upon his home and tries to hurt Angela, but Angela runs to Kulog who then tries to protect her. The villagers see this and, thinking Kulog is hurting Angela, they attack Kulog and hack at his tree. Eventually, Kulog disappears, Angela’s father mellows down and stops beating her, and they move away. The house continues to be terrorized by some supernatural presence, but the creature does not show itself to human eyes ever again.

Both stories, while supernatural, more rightly belongs to what David G. Hartwell (1987) calls the “ambiguous fantastic” stream of horror fiction. These stories are characterized by their ambiguous rendering of the nature of reality—it starts out with a “pretense of everyday reality” which it then annihilates (p. 10). It may do this by leaving certain things undescribed or unexplained. For instance, the narrator in “Daddy” moves quickly from shock at registering her father’s voice on the phone to accepting it as fact; in “Kulog,” the reader is not even given a chance to hesitate to believe in the supernatural and fantastic—from the get-go, the supernatural is established as fact, by virtue of the narrative being told from within the supernatural itself, from the point of view of the *kapre*. No one explains why or how a dead person can make phone calls or a *kapre* exists and has a complete and working psyche. But unlike the other stories, the horror in these stories go unresolved—Yvette goes on suffering the horrors of grief and longing, whether for her dad or for an explanation to what he meant by ‘don’t forget’; Kulog goes on terrorizing the house, Angela goes on missing Kulog, and her mother continually goes through life afraid her child will be taken from her. In these two stories, there is dread, but it is not the explosive dread of conventional horror but, rather, existential dread at this absurd world we find ourselves imprisoned in.

Another story under the heading of the ambiguous fantastic is “Boss, Ex?” The story’s protagonist is Bien, a movie buff who is about to be married in two days, and it is set in a future in which ID Chips that store identification, records, and money are inserted into human brains. One day, he goes to Virra Mall to buy a microchip of a rare movie, when a peddler, Rodel, follows him from store to store asking him “Boss, Ex?” again and again. When Rodel calls him by name, he is weirded out and decides to find out what Rodel is selling. Turns out he’s selling microchips of Bien’s ex-crushes, flings, and girlfriends. Apparently, something happened during the procedure to install the ID Chip in Bien’s head that allows the chip to hold more than just information but Bien’s memories as well. Rodel just happens to hack Bien’s ID Chip and is now selling him the microchips of these memories at exorbitant prices. Bien gives in though and is surprised when Rodel gives him an extra chip, that of his fiancé Sheila, all for free. It apparently holds footage of something that has yet to happen to them, and there the story ends.

In this story, the truthfulness of reality is rendered ambiguous by

the fact of Rodel, a man only Bien has seen so far, who successfully sells him microchips whose contents only Bien and Rodel have seen so far. It is further made complicated by the lack of explanation as to the contents of the chip for Sheila. We do not know whether Rodel and the chips really do exist or if this is Bien's brain's way of coping with the stress and pressure of the upcoming wedding that he seems more and more reluctant to do. One thing is for sure though, Bien's world is now irrevocably changed by the knowledge that his memories are not his and his alone and that the comings and goings of the women in his life, be it in real life or in his mind, can be (re)mined by Rodel and other equally talented hackers and are thus forever beyond his control. Or the knowledge that his own psyche is capable of conjuring such elaborate lies to his own self to get out of unpleasant situations. Whatever the answer is, though, is not revealed to us readers. Whatever the contents of the microchip for Sheila are or whether or not Bien pushes through with the wedding, we will never know. Both Bien and the reader are, by the end, confronted with dread not of the type commonly associated with the horror genre but of the unresolved horrors of the story.

The remaining two stories in the collection, "Delivering the Goods" and "Fade to Nothing," can be classified under what David G. Hartwell (1987) calls the "psychological metaphor," in which "aberrant human psychology embodied metaphorically" (p. 9).

The third story, "Delivering the Goods," centers on Yosi, a runner, who is tasked to buy a three-year-old child from his junkie mother and deliver it to his employer. When his employer invites him to stay, he does so and becomes accessory to the killing of the child, the harvesting of his organs, and the stuffing of bags and bags of cocaine into his small body. When things do not go as planned, Yosi is given the additional job of bringing the boy's body to Saigon.

In the story, all adult characters manifest psychologies that do not exactly conform to the norm. The most obvious would be Prado who liked cutting up children, but his colleagues Yosi and Dong and their employer, Mr. Hernandez, also show varying levels of psychological deviation in their desensitization to the violence performed upon the innocent child. Moreover, in Tolentino's study of the Shake, Rattle, and Roll franchise (2016), he notes that horror can function as social melodrama in its ability to "provide a critique of social and historical realities." For instance, what the urban legend of the White Lady has in common with Bernal's social

melodramas is the injustice from which the horror of both genres emanates. In this story, the injustice clearly stems from the poverty of the characters and the unpalatable things they must go through to survive and end this poverty. Joben, the boy born to a junkie mother, must suffer the horrors of death to end his misery; Yosi, the runner, and Dong, the soft-hearted criminal, must suffer through the horrors of witnessing and abetting in the death and defilement of Joben's body for capitalist gain. Even Prado, "the sick man who likes cutting children," is subject to the same capitalist injustice. As a poor goon, he is unable to indulge his abnormal tendencies freely, but must instead subject them to the dictates of the capitalist. In the sensitivity shown by both Dong and Yosi, however, and in the story's neat and final resolution, they and consequently all those who must suffer the horrors of economic injustice and must undertake horrible things to survive are given reprieve if even for awhile, their guilt expressed by Yosi when he cries for the dead boy.

Lastly, "Fade to Nothing" is about Felicia, a beautiful bulimic woman whose life's mission is to prey on men, the story narrated by her friend, the successful painter, David, who is so obsessed with her that he assists her when she needs to throw up and gets her men when her self-esteem is on an all-time low. Both seem to be fine with the arrangement though, both being individuals whose existences are sharply defined by others—Felicia whose identity depends on her ability to pleasure and control men, David whose identity depends on being Felicia's knight. However, the arrival of Owen and Lily in their lives complicates things: when Owen discovers that Felicia is roommates with David, he stops going out with her, and Felicia gets mad. David then sets her up with his friend Jason to appease her and then sleeps with Lily. Felicia gets hurt by this. At the height of her sickness, she faints and is brought to the hospital. Earlier in the story, David describes himself and the men who come and go in Felicia's life as her imaginary friends, "dolls that dissolved into nothing as soon as she was done playing" (Tan, 2009, p. 108). In the end, the metaphor reaches its peak expression, as David, feeling himself the useless knight, finally disappears once and for all.

The story's horror is derived from all the psychological issues this story has by the bucket: from bulimia to insecurities, to toxic relationships, to emotional manipulation, and to being so utterly dependent on other people for self-worth. Often, relationships like this are hard to cut off, behavior patterns hard to change, but after exposing the reader to the horrors



of these psychological issues, he/she is offered release by the complete elimination of David, a deed that vanquishes his obsession for Felicia and his encouragement of her illness and, for a short while, her dangerous dependence on men.

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As can be seen in the stories discussed above, horror fiction uses a variety of devices to achieve its desired effect on the reader. Yvette Tan in *Waking the Dead and Other Horror Stories* writes in the three main modes of horror—the moral allegory, psychological metaphor, and ambiguous fantastic—to render the many forms of dread; she uses elements in our culture, from mythological creatures to urban legends, to historical trauma, and to local customs and rituals, to create horror fiction that is distinctly Filipino; and she uses the themes of vanity, grief, desire, and guilt, among others, to tell stories that have universal appeal. But it is in her ability to dissect and get to the heart of our modern-day fears and anxieties, and the resolution she affords us, no matter how temporary, that is the book's final and best offering.

## NOTES

- <sup>1</sup> This is an allusion to the popular urban legend about Marcos ordering that children be kidnapped and killed, their blood mixed in with the bridge's foundations and their corpses thrown into the sea (Oddity World, 2014). Though it is not stated directly, this is reinforced some pages later, on page 24, when Dab sees Madame's soul wandering around exclaiming about her children, her sons and daughters, and not apologizing for a choice she has made (Tan, 2009).

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ISSN 0037-5284