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Market–oriented Reforms, their Sustainability and Unintended Outcomes: The Case of Bangladesh Agriculture Sector

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Abstract

In the quest for sustainable development, developing countries have embarked on ambitious market-oriented reform policies mainly advocated by international development agencies (IDA) in varying proportions over the last three decades. These policies have been criticised as they have not succeeded in promoting sustainable development. as they are often associated with negative externalities or unintended outcomes. Drawing on the findings of an exploratory study undertaken during 2003-2004, this paper reports the unintended effects of the market-based reforms in agriculture sector - which are often claimed to be one of the success stories - in Bangladesh. It is concluded that although the reforms had some notable achievements, they have not achieved their expected outcomes and more importantly, in cases where they have been achieved, their sustainability is in question mainly due to their unintended effect on environment and lack of responsible business practices of private entrepreneurs involved in the trading of agricultural inputs like fertiliser, seeds, pesticides and irrigation equipment. As Bangladesh stands as an exemplar of developing countries, this paper provides implications and a testing ground to consider the contexts and practicalities of market-oriented reforms in other developing countries as well.

Key Words: Developing countries, market-oriented reforms, sustainable development, unintended outcomes

Introduction

A market-oriented development approach has been a dominant phenomenon of the last three decades adopted by both developed and developing countries in varying proportions. In developed countries, the market-oriented reforms have coincided with 'New Public Management' (NPM) which has followed an agenda of pro-market reforms, aiming to reduce the size and scope of the government by using market mechanisms (Hughes, 2003). In developing countries, the external pressure of the international development agencies mainly the World Bank (WB) and International Monetary Fund (IMF) played a more significant role than self propelling activities of market forces and the power of the rationality of the market in implementing the market oriented approach.

Bangladesh has been pursuing decades of market-oriented reforms, supported by WB and IMF, with the prime objectives of achieving an efficient, cost effective service delivery through the increased involvement of private sector. As a result of these reforms pursued by international donors, Bangladesh has increasingly moved towards a market-based economy since the mid 1970s. Although various reforms have been attempted in various sectors, the success of these reforms remains elusive.

In this context, the reforms undertaken in the agricultural input management system appear to be somewhat different and interesting. Not only the reforms were undertaken in the most important sector of the economy, they were pervasive and are often termed as one of the success stories. There have been significant achievements in the agriculture sector in Bangladesh in the last two decades following the reforms. Despite a steady increase in population, the country has successfully changed its position as a food deficit country to one which is sufficient enough in food grain production to feed its population since 2000 (Centre for Policy Dialogue, 2001). Accompanying increased food production, food security has also improved. This is a remarkable achievement given the limited availability of land to increase agricultural production, the limited resources and the fact that natural disasters in the form of floods and cyclones are regular in Bangladesh which adversely affect agricultural production.

While some studies have reported the positive effects, attributing the achievement of self sufficiency in food production and food security to the market-based reforms in the input delivery system of agriculture sector (Ahmed, 1995; Ahmed, 2000; Hossain, Lewis, Bose and Chowdhury, 2003), other studies have reported the negative externalities of the reforms on the environment and decreased yield. They have argued that agricultural production has been achieved at the cost of adverse effects on the environment and natural resources (Pagiola, 1995; Toufique, 2000; Bhattacharya and Titumir, 2001). It is also argued that the reforms have opened up several new concerns in terms of the price, quality and availability of the agricultural inputs (fertiliser, seeds, pesticides) and particularly in the environmental aspects (Bhattacharya and Titumir, 2001). Recently the problem of mass Arsenic poisoning affecting a large area of Bangladesh has also been reported. More recently, frequent incidences have been reported of sale of low quality, underweight, contaminated agricultural inputs[1] sometimes at high prices.

Of the three decades of reforms in the agriculture input sector, some studies have looked at isolated aspects of the reforms on environment. To date, there has been no comprehensive study investigating the unintended effects of the reforms, yet this is a highly significant issue, given the importance of the sector in the economy, especially in the wake of environmental problems that Bangladesh is currently facing. To address this gap, this paper draws upon the findings of an exploratory study[2] to report the unintended effect of reforms.

[1] Recently, the sale of contaminated agricultural inputs has become quite common in Bangladesh. There are reports in local newspapers that dealers were selling contaminated agricultural inputs e.g. fertiliser mixed with cement granules, and low quality seeds and pesticides (Reporter, 2004). More recently, the Consumers Association of Bangladesh (CAB) reported that most of the fertilisers used by the farmers were contaminated and substandard (UNB, 2007).

[2] An exploratory study was undertaken by the author during 2003-04, which had both quantitative and qualitative components to investigate the perception of the key stakeholders on the reform policies. A total of 154 surveys were conducted with public officials, private entrepreneurs and farmers in Dhaka-the capital city of Bangladesh. Sixteen semi-structured interviews were conducted with representatives of WB, United States Agency for International Development (USAID) and senior bureaucrats involved with reform policies.

This article uses Bangladesh as an exemplar as it stands as a typical representative of the developing countries in terms of a large population, poor resource base, low per capita income and a predominantly agro-based economy with problems associated with lack of responsive governance. The use of Bangladesh case study provides a testing ground to consider the contexts and practicalities of market oriented development approach in other developing countries.

The paper is organised in two sections. The first provides an overview of the market-based reform efforts in the agricultural input sector. Drawing upon the findings of the exploratory study, the second section examines the impact of these reforms with a particular focus on the unintended effects of the reform policies followed by conclusion and implications of the study.

Market-oriented Reforms in Agriculture Sector of Bangladesh - An Overview

Before the reforms started in mid 1970s, the agriculture input sector demonstrated an example of single channeled public delivery system. The Bangladesh Agricultural Development Corporation (BADC) -a government owned corporation- with branches all over the country was responsible for procuring and distributing agricultural inputs such as fertiliser, seeds, pesticides and irrigation equipment to the farmers and therefore served as a virtual monopoly over the agricultural input market in Bangladesh (Ahmed, 2000). Besides the prohibition on the participation of the private sector in the input market, the government also provided heavy subsidies for fertilisers and other inputs (mainly irrigation equipment) which distorted the input market. In addition, the system was not very efficient and had problems of rent seeking and poorly motivated staff (Ministry of Agriculture, 2002).

According to the World Bank (1990) and United States Agency for International Development (USAID) (1996), the inefficient input delivery system and a weak institutional and policy framework were impeding agricultural growth and development throughout the 1970s and the public sector was seen as incapable of delivering increased quantity of inputs to a larger number of farmers.

Reforms were therefore pursued with the prime objective of achieving an efficient, cost-effective service delivery. The expected outcomes of the reforms can be grouped into economic and social aspects as explained in Figure 1. The intended economic outcomes included increased agricultural production to the point of achieving self sufficiency, better availability and access of inputs, better affordability and crop sector profitability, phasing out of subsidies, promoting greater involvement of the private sector in the management and distribution of inputs and improvement of system efficiency. It was assumed by the government and the donors that these benefits would trickle down, leading to improved food security and ultimately to improved socio-economic conditions of the farmers in terms of better living conditions (USAID, 1996).

Figure 1: Expected Outcomes of the Reforms

Economic Benefits of Reforms:

- Increased food production
- Increased and easy access to inputs
- Better affordability of inputs and increased crop sector profitability
- Decreased burden of subsidy
- Increased efficiency
- Greater involvement of private sector

***Social Benefits of the Reforms*:**

- Increased food security
- Improved socio-economic conditions of the farmers

Source: based on the information from WB (1990) and USAID (1996)

Reforms in the Input Market

The major reforms in the agriculture sector that have brought significant changes started in the late 1970s and continued into the 1990s and officially are still continuing. However, apart from some revisions, reform efforts have been minimal during 2000-2005. The international development agencies that were involved with the reforms in the input market were the WB, IMF and USAID. According to Dreze, Sen and Hussain (1995), the reforms in the agriculture sector mainly focused on:

- withdrawal of input subsidies
- distribution of fertiliser through private traders
- private ownership of irrigation equipments (all kinds of tube wells and power pumps) with large scale irrigation projects being executed by the public sector
- expansion of the private sector's role in the import, domestic manufacture, sale and servicing of irrigation inputs
- greater private sector involvement in the distribution of agricultural inputs, production, processing and distribution of seeds.

The shift towards marketisation as a result of the reforms has led to a complex, horizontal and networked structure of partnerships between state and non-state actors. The private sector and NGOs are now delivering agricultural inputs like fertilisers, seeds, pesticides, irrigation equipment which were once the responsibility of the state.

Review of the Reforms: Expected and Unintended Outcomes

Findings from both surveys and interviews of the exploratory study confirm that agricultural production increased following the reforms. However the increased agricultural production is dominated by one single crop – rice. The reforms have also increased the availability and access of inputs and as a result, the use of inputs has increased markedly. The efficiency of the system has increased after the reforms and the inputs are now much more easily available compared to the state-dominated era. However, there have been some problems with the timely availability of inputs particularly fertiliser, seeds and fuel for irrigation. There have been fertiliser crises almost every year during peak demand periods, with shortages of fertiliser supply, price hikes and sale of contaminated fertiliser (Azmat and Coghill, 2004). The condition is the same for seeds (Alamgir et al., 2004). In most cases, the crisis is artificially created with the motive of increasing profits. The lack of responsible business practices by the private entrepreneurs leading to artificial crises, although not very severe, is among the unintended effect of the reform policies as they are undermining the success of the reforms, creating an adverse impression, mainly among the farmers who are the consumers.

Table 1 presents the views of public officials working in three main agricultural institutes in Bangladesh[3]. It is clear from the table that the respondents perceive that reforms undertaken in this sector are leading to environmental problems in terms of decreased soil fertility, decreased yield mainly due to excessive use of fertilisers, intensive irrigation and mono-cropping. Also, more than half of the officials (59.3%) agreed that reforms have contributed to Arsenic poisoning. Interestingly, despite these problems, only 29.7% believe that the reforms are not sustainable which means that they believe that the non-sustainable practices can be overcome.

[3] The three main agricultural institutes were the Ministry of Agriculture, Department of Agricultural Extension (DAE) and Bangladesh Agricultural Development Corporation (BADC).

Table 1: Perception of the Public Officials on Market-oriented Reforms and Environmental Problems (N=54)

Issues	Disagree	Neutral	Agree
Reforms led to further environmental problems.	33.3	24.1	42.6
Mono-cropping is contributing to decreased soil fertility and yield	13.2	7.5	79.2
Reforms have contributed to Arsenic Poisoning	9.3	31.5	59.3
Ground Water extraction should be stopped.	24.7	22.6	52.8
Excessive use of fertilizers has resulted in decreased soil fertility and yields.	22.2	18.5	59.3
Reforms are not sustainable	57.4	13.0	29.7
Intensive irrigation leading to non sustainable environmental practices	29.6	31.5	38.9

Source: Study data

The increased availability and use of inputs, mainly fertiliser and irrigation, adoption of modern varieties and a shift to dry season irrigated rice have contributed to the increase in agricultural production to the end of achieving self sufficiency in rice production. There have been marginal increases in the production of other crops such as wheat, pulse, potato, oil and vegetables. Although Bangladesh has achieved self sufficiency in food grain production, sustainability of this self sufficiency remains uncertain with an increasing population. Bangladesh remains in a dilemma concerning rice-led production. It is also argued that while not highly profitable, rice contributes to improved food security and provides a spring board for both rich and poor farmers to move into non-farm income activities (Hossain et al., 2003). Nevertheless, there is a need for diversifying to non rice crops while increasing rice productivity. The main problems in crop diversification have been found to be a lack of marketing and storage facilities for vegetables and fruits, and the eating habits of most of the population who depend on rice as the major staple.

Bangladesh faces greater challenges in preserving the environment as it faces the problems of poverty, increasing population, illiteracy and scarcity of resources; all these factors contribute to environmental degradation. Ahmad and

Hassanuzzaman (1998) argue that there is a vicious circle through a positive correlation between poverty, population and deterioration of the environment. Studies have also reported the environmental problems as a result of the reform policies (Toufique, 2000; Pagiola, 1995). Reforms have led to excessive and indiscriminate use of fertilisers, particularly urea, leading to decreased soil fertility, creating the need for use of more fertilisers and thus creating a vicious circle. These problems are further aggravated by the sale of contaminated agricultural inputs which has become quite common and is also decreasing soil fertility and yield.

Findings of this exploratory study also suggest that reforms have aggravated the environmental problems which include decline in fertility, yield and probably Arsenic poisoning. These unintended effects are mainly due to their pronounced effect on the use of irrigation and fertilisers as a result of the reform policies which are also supported by the existing literature (Bhattacharya and Titumir, 2001; SAPRIN, 2002). According to Daitoh (2003), externalities arise when certain actions of producers or consumers have unintended external (indirect) effects on other producers or/and consumers. In this case the effects of the reforms on the environment are unintended but have the potential to undermine the positive effects achieved so far. These negative externalities of the reforms are therefore threatening the sustainability of the positive effects of the reforms particularly increased production, food security, affordability and the socioeconomic conditions of the farmers.

The reforms in the input delivery system have led to increased availability of agricultural inputs which in turn has led to a series of actions which are unintended and adversely affect the environment and the consumers as discussed below. Table 2 summarises how the reform policies are leading to environmental problems. The possible impact of the reforms on irrigation, fertiliser, and pesticides is discussed below.

Table 2: Impact of the Reform Policies on Environment

Policy	Action / Consequences	Impact on Environment
Irrigation Privatisation of the distribution, procurement and operation of minor irrigation equipment	Increased use of minor irrigation equipment Random and unregulated use of equipment without a balanced strategy Increased cultivation of rice	Monoculture leading to decreased soil fertility Excessive extraction of ground water leading to drying of aquifer beyond the natural capacity of the aquifers to recharge Probable cause of Arsenic problem
Fertiliser Withdrawal of subsidy except the economic subsidy on urea Privatisation of the procurement and distribution of fertiliser	Private sector participation in procurement and distribution of fertilisers Excessive use of fertilisers particularly urea Use of spurious fertilisers	Land degradation Nutrient content of soil reduced Fertility of land eroded Decreased agricultural yield
Pesticides Involvement of private sector in the import and distribution of pesticides	Increased use of unregulated Pesticides	Mono culture of rice Loss of bio diversity
Seeds Involvement of private sector in the production, import and distribution of seeds	Quality of seed not ensured effectively	Decreased effect on productivity

Source: Study data

Irrigation

It is reported that of all the vulnerabilities characterising irrigated agriculture today, none looms larger than the depletion of the underground aquifers more rapidly than they are being replenished (Brown et al., 2000). Brown *et al.* (2000) also report that the groundwater used about half the level of natural replenishment on annual basis in Bangladesh. There has been a sharp increase in irrigated area following the reforms and this has been associated with multiple problems as discussed below.

The reforms have led to the intensification of irrigation which in turn is leading to a series of chain reactions adversely affecting the environment. Figure 2 shows the probable effects of irrigation on environment. It has been reported that the current practice of irrigation in Bangladesh through flooding of land promotes the cultivation of rice and due to the absence of appropriate field design channels, the cultivation of other minor crops along with rice is not practised (Bhattacharya and Titumir, 2001). As a result, intensive irrigation is promoting the mono-cropping of rice. It is reported that mono-cropping of rice decreases soil fertility, depleting micronutrient and organic matter in the soil which in turn leads to increased and excessive use of fertilisers to compensate (Mahmud, 1998; Bhattacharya and Titumir, 2001). Despite the problems of mono-cropping of rice, the cultivation of rice is also important as is explained by one of the interviewees,

> *In Bangladesh, we are in a dilemma. We have a huge population which is increasing at the rate of 1.4% each year and the land is decreasing everyday. So at one hand, the government has to ensure self sufficiency in cereals and produce enough rice and on the other hand, we talk about crop diversification. The only thing that can happen is to have breakthrough in yields otherwise it will not be sustainable.*

Intensive irrigation is also associated with the excessive use of urea as it is the main fertiliser used for rice production rather than other fertilisers. The excessive use of urea is leading to imbalance in soil nutrients and decreased soil fertility. The unintended and adverse effect of the reforms on the environment is evident from the perceptions of the public officials (See Table 1). A majority of the public officials think that mono-cropping of rice is contributing to decreased soil fertility and yield and more than half of them think that reforms are contributing to arsenic poisoning. In addition these unintended effects on environment are further compounded by the sale of poor quality fertilisers, seeds and pesticides, further leading to decreased fertility, yields and production. Commenting on this issue, one of the respondents commented that,

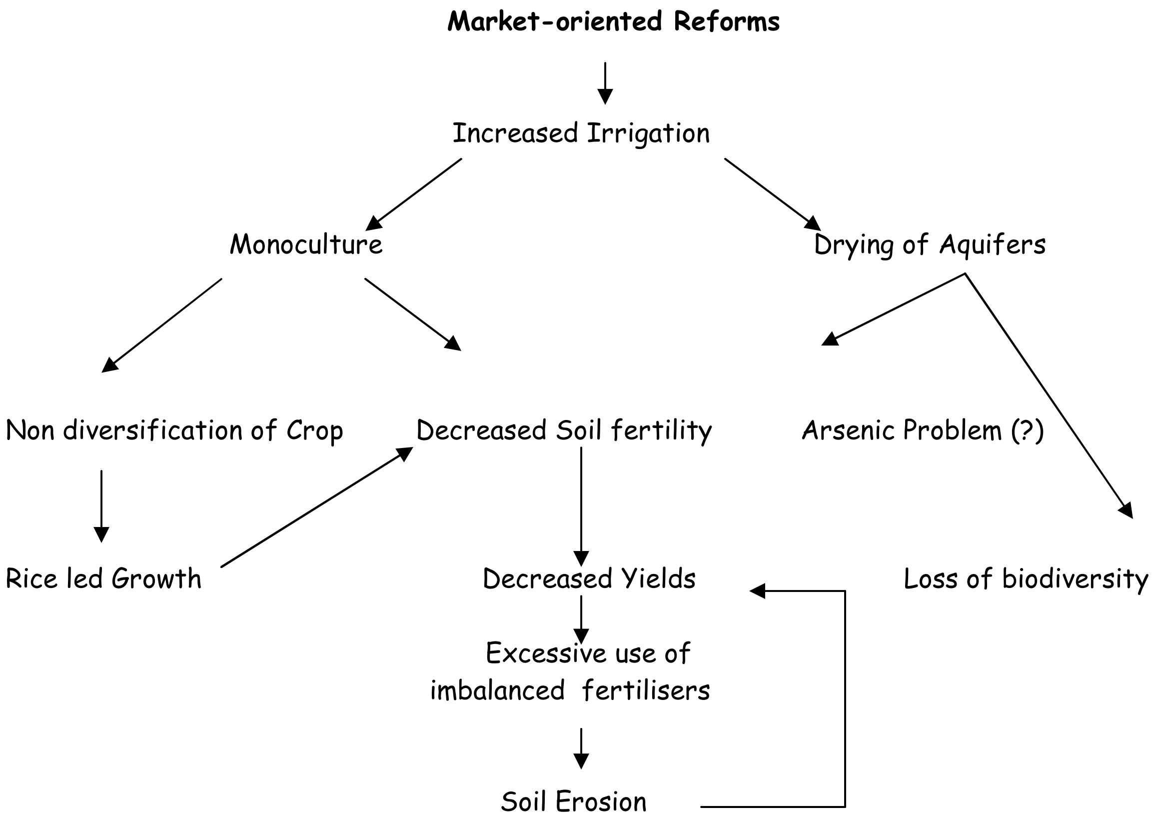
> *(The) quality of fertilisers is much inferior and some people are working behind the scene. There are complaints from the farmers that they are paying high price but are*

> *not getting the quality in return. That needs to be controlled by the government. If government can effectively control, the reforms will be cost effective. Corruption may be there but government needs to find out measures for combating corruption.*

Intensive irrigation has also promoted the random and uncontrolled use of irrigation equipment with drying of the aquifers which is possibly a contributing factor to Arsenic poisoning and loss of biodiversity. Findings from both the surveys and interviews of the study also confirm that after the privatisation of irrigation equipment, there has been an increase in the random and unregulated use of irrigation equipment and this has resulted in the excessive extraction of ground water beyond the capacity of the aquifers to recharge, exposing the population to harmful minerals like Arsenic, Manganese, Lead, and Nickel. This is also supported by Bhattacharya and Titumir (2001), who have reported that the reform policies in irrigation have led to excessive extraction of ground water, which might be the possible cause for Arsenic contamination of drinking water. Similarly, Abdullah, Hasanullah and Shahabuddin (1995) have also reported the concerns of the possible impact of increased groundwater extraction as a result of the reforms leading to lowering of ground water levels, and drying up of drinking water pumps and surface water sources. Respondents of exploratory study in their interviews were also divided on their views about the possible links between reforms in the irrigation sector and Arsenic contamination of drinking water. While about half of them stated that there was great deal of controversy surrounding this issue, the other half held the view that the water resources were being over exploited and that the Arsenic problem was a by-product.

As shown in Figure 2, increased irrigation has been associated with mono-cropping and drying of aquifers. The excessive use of fertiliser due to mono-cropping of rice has led to soil erosion, decreased yield and productivity, thus creating a vicious circle. Findings of the exploratory study also suggest that there are probable links of the intensive irrigation with the problems of Arsenic contamination of drinking water. In addition, mono-cropping is also leading to rice-led growth and non diversification of crop.

Figure 2: Probable Effects of Intensive Irrigation on the Environment



Source: Information gathered from the surveys and interviews of the exploratory study; Bhattacharya and Titumir (2001), Toufique (2000) and Pagiola (1995).

Fertilisers, Seeds and Pesticides

Table 1 shows the impact of fertilisers, seeds, and pesticides on the environment, following the reforms. Findings from both surveys and interviews of the exploratory study report that reforms had led to an unwise and indiscriminate increase in the use of pesticides and fertilisers which was having an adverse impact on the environment, contributing to decrease in soil fertility. In addition, the sale of poor quality, contaminated fertilisers, seeds and pesticides are also having an adverse effect on soil fertility, affecting the micro-nutrient component of soil and decreasing the yield.

Pagiola (1995) has studied the environmental problems that have been raised from the increased use of fertilisers, irrigation and adoption of modern varieties as a result of the reform policies. The study concludes on the basis of increasing evidences that intensive agricultural practices are degrading the natural resource base for agricultural production.

Similarly, based on secondary data, Toufique (2000) in his study has reported that pressure to increase food grain production has led to excessive emphasis on increasing yield and the withdrawal of subsidies leading to policies that have resulted in excessive and inefficient use of poor quality fertilisers.

The perceptions of the respondents of the study reinforced the findings that the sale of contaminated inputs at inflated prices and their associated environmental problems further threatened the sustainability of the positive effect of the reforms. The lack of good governance, adequate market information, and awareness were the main factors leading to the lack of responsible business practices of the private entrepreneurs involved in the sale of agricultural inputs.

In summary, the reforms in the input delivery system led to increased availability of agricultural inputs which have led to a chain of actions which include intensive irrigation, mono-cropping, lowering underground water tables, indiscriminate excessive and unbalanced use of fertilisers and pesticide, and use of lower quality contaminated agricultural inputs, contributing to environmental degradation.

Conclusion and Implications

Market-oriented development approach is being attempted by the developing countries in an effort to improve sustainable development. However, in most of the cases, the results of the reforms remain far from satisfactory. Bangladesh – a developing country has been attempting the market-oriented development approach for more than three decades and these reforms have been most pervasive in the agricultural sector. The paper draws upon the summative findings of an exploratory study to investigate the unintended effect of market-based reforms undertaken in the agricultural input sector on the environment. Findings conclude that although these reforms have been successful to some extent, they have not lived up to their expectations mainly as a result of their unintended effect on environment. Whatever the claims of economic efficiency, the reforms have been only partly successful in meeting the test of efficiency in the delivery of the sustainable social benefits which were, after all, their ultimate objective.

The negative externalities of the reforms have posed a serious threat to the environment and the sustainability of the reforms. The adverse impact on environment due to mono-cropping, and excessive and unbalanced use of fertilisers is leading to a decrease in soil fertility, loss of biodiversity which in turn is having a significant adverse impact on agricultural yields. Although the cause of the Arsenic poisoning is still being investigated, the intensive irrigation promoted by the reforms and the resultant drying of aquifers cannot be ruled out as its probable cause. The lack of socially reasonable business practices of the private entrepreneurs and the sale of the poor quality of agricultural inputs are also contributing to negative environmental impacts, preventing the reforms from reaching their potential and threatening the sustainability of the positive effect of the reforms.

The negative externalities of the reforms are leading to the decline in yields and productivity, thus questioning the sustainability of increased production, self sufficiency and food security and therefore need immediate attention.

The study provides implications for donor agencies and government that they need to address the unintended effects of reforms for the success and sustainability of the reform policies. As Bangladesh is a typical representative of the developing countries, these observations apply for other developing countries as well who have adopted a market-oriented development approach.

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Revisiting Foucault: The Concept of Power

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Abstract

This article briefly reviews, discusses, and assesses Foucault's conceptualization of modern power. It provides a short critical inquiry into the relevance and contribution of his analysis of power. Consequently, it attempts to give emphasis on the importance of studying and analyzing the phenomenon and concept of power, specifically its current, modern form.

It concludes that although Foucault's concepts have laid foundations in understanding the modern forms of power, they cannot be regarded as final and complete accounts. Instead, they should serve as a basis or starting point for a more systematic, concrete, and informative understanding of this phenomenon.

Key words: Discourse, Foucault, government, knowledge, power/modern power, regulation

Introduction

Any attempt for discussion on Foucault is amiss without foregrounding his post-structuralist take on power within his social theorizing. It also postulates the analysis and understanding of a wide array of other pertinent concepts and assumptions. Within the tradition of social theorizing, a common way of understanding him and the movement that has been attributed to him and his works is by looking at it as rejecting or as a response to some established metanarratives or grand theories, particularly Marxism. Another, more broadly, is by putting and understanding it within the context of post-structuralism, as well as postmodernism – two movements under which many of his ideas and assumptions are said to fall.

For the purpose of this essay, no comprehensive comparison with relevant grand theories will be done, and discussion will focus on Foucault's concept of power. However, every now and then, there will be a need to bring into discussion the structuralist approach to power – at times to make a necessary comparison between these two groups of concepts.

Critical of the status quo and the various forms of oppression in Western capitalist societies, Foucault aims to develop a kind of analysis that would explain power, dominance, and opposition. In doing this, he rejects the theorizing that the individual is the origin of meaning and the starting and focal point of any social analyses. Specifically, he rejects the assumptions that underscore the individual's freedom to resist oppression and the centrality of human consciousness.

Foucault argues that individuals by nature are not free but instead socially determined and produced by various discourses that put them within certain practices and in relations of power (Layder, 1994). It is discourse, for example, that determines what an individual can think, say, or talk about the issue of gender, whether or not what he/she has in mind, or what he/she has to say is acceptable and meaningful. It is discourse that constructs a person's subjectivity, or how that person makes sense of the world. Specifically, it offers individuals a subject position from which they can understand and interpret the things around them.

In speaking of a certain discourse (e.g. discourse on gender equality), an individual takes up a subject position and becomes under the governing power of that discourse (Barker, 2003). For instance, in talking about the discourse on gender equality, we may take up the feminist position advocating equality between the male and female genders across the board. By doing so, we become subjected to the regulatory power of that specific discourse. We may, for instance, as prescribed by that subject position, need to denounce any compromise that may be put forward in terms of giving equal rights to females. This in turn may help form our subjectivity on the matter. For example, we may develop a consciousness that any practice that puts males in an advantageous or superior position over females is unjust and a form of oppression.

New concepts of power

One of the primary areas in which Foucault's assumptions break away with grand social theories like Marxism is in his conceptualization of power. For classical Marxism, for example, power is always associated with the ruling class; for Althusser and his structuralist Marxism, it is chiefly in the hands of the state. In these two areas of Marxism, power is viewed as originating in a single source, coming from a center, centralized or involving a systematic oppression.

For Foucault, power is found everywhere, permeating every segment of society, every sphere of life and human relationships; it is dispersed and inescapable – always putting people in relations of power. In his own words, power "is not a substance. Neither is it a mysterious property whose origin must be delved into. Power is only a certain type of relation between individuals" (Foucault, 1981, p. 253).

This last point – that power is merely a kind of relation, provides a key to the main feature of this concept of power: that in this relation, some individuals are able to regulate other people's conduct. But this is not a regulation of conduct that is complete or forced. Foucault makes a clear distinction between force and power: a relationship that involves or relies on violence is not of power, but of force. For example, we may call the relationship between detainees and their military or police interrogators as that of force, and not that of power, if the technique of compliance used is torture or any other form of violence.

There is also the possibility of resistance. No power is without a chance for revolt. Thus, a dictator's power is not without potential resistance, no matter how absolute his rule is deemed. Parents are not always in the position of being able to regulate their children's behavior. Constituents may look into or question the rationality their political leaders use to govern them. The ruled are not infinitely oppressed, and the rulers are not infinitely oppressing.

But how do some people regulate others' conduct? Although various factors may ascertain power, governing other people's conduct always involves a kind of rationality – a rationality that is achieved by gaining knowledge of those whose conduct has to be regulated, to make them act or behave in a certain way. For example, for a priest or a pastor to get a better attendance of his flock at the Sunday service, he needs to know what makes and does not make them allot time for the service. And to ensure the constant attendance of the devout churchgoers, he may use a kind of rationality within the discourse of religious obligation.

And to resist domination or regulation by others, a person needs to question the rationality used in a relation of power. For Foucault, denouncing the use of force or criticizing a person or an institution is not the way to resist power – but questioning how the relations of power are rationalized is. In a feudal lord-vassal relationship, for example, a vassal is not resisting power by attacking or criticizing the feudal system or the feudal lord. Likewise, a citizenry does not fend against their government's power over them by attacking its services tax policy, or its encroaching use of military force. In mass media, the Singapore press, for example, is not resisting the government's regulation of their conduct by lambasting its infringing mass media laws and policies, nor do they resist power by blaming the Singapore citizens for their complacency and too much faith in the current administration. A vassal rejects domination by questioning the feudal lord's rationality in ensuring his vassal remains indebted and subordinate to him. Citizens resist the state's power by questioning the rationality used by their government in its imposition of high services tax and use of strong military force. Similarly, the Singapore press may resist domination by examining the rationality used by the government in its stringent regulation of the Singapore print media. The important point to emphasize here is that power always entails resistance – control is never complete.

Forms of Power

One of Foucault's main assumptions on power is his proposition that in the 17^{th} and 18^{th} centuries, a new form of power has emerged – different from power that is associated with someone sovereign, possessing a subjugating (and thus, negative) form of power, like a king or a monarch. Although Foucault does not question the legitimacy or validity of this old concept of power – that of sovereign power – he suggests that it no longer is able to give an accurate account of the kind of power that has surfaced in the recent centuries. He traces the development of this form of power to the rise and dominance of monarchical types of government in Europe during the medieval period, where feudalism often prompted rivalry and conflicts (Foucault, 1980).

One kind of power that Foucault identifies as having emerged in the 17^{th} and 18^{th} centuries is the disciplinary form. This power puts people under constant surveillance instead of physical penalty. Earlier, people were subjected to physical punishments like torture in many social institutions like the prisons and mental asylums, and even in schools. The new form of power focuses instead on understanding the psychology of individual subjects and controlling them by making them regulate their own selves. Thus disciplinary power does not require external exertion of power. Knowing that that they are being watched, individuals would initiate to regulate their own conduct, without an external agency exerting force on them (Layder, 1994).

This form of power allows for control of large numbers of people (Layder, 1994). In the institution of schools, for example, the system of continuous assessment may lead the students to constantly regulate their behavior to meet the school's requirements for the assessment of their performance. In modern societies, organizations' use of surveillance camera at places of work may lead to self-disciplining of their employees. Their knowledge that they are under surveillance may cause them to regulate their conduct in a way that their employer would want them to conduct themselves (e.g. devote their time to meeting their expected result, reaching higher productivity rate, etc). These ways of self-monitoring are what Foucault calls technologies of power that various institutions use to ensure compliance – part of the overall system of surveillance utilized in modern societies.

Foucault identifies another form of power that he posits has emerged in the modern times – the bio-power. This power aims at the body and populations in their entirety instead of specific individuals or groups of people. According to Foucault, the governments of modern societies are no longer that preoccupied with problems governments of earlier epochs had to deal with, such as problems of finding new territories or maintaining them. Instead, governments of modern times are concerned with governing their populations, for example, understanding and determining what they need and do not need. This type of power or governance has 'normalized' certain practices, behaviors, customs, etc through discourse, while defining other practices, behaviors, and customs as unacceptable or abnormal or deviant. This form of power, thence, makes the act of domination possible by offering opportunities for control instead of limiting or punishing (Layder, 1994). The discourse on incest proffers an example of how this form of power may be said to be working. The dominant discourse on incest in Western or Western-influenced, predominantly Christian societies dictates that the act or practice of sexual intercourse with a relative (at least up to third-degree relatives) is abnormal and unacceptable. For the Christian dogma, it is immoral or a mortal sin. This canon is supported by many institutions of these societies –legal, health, religious, and moral. Even political institutions find themselves upholding this practice, in some cases in adherence to the religious traditions and prevalent customs of their societies. With the dominance of the stance of these institutions on the issue of incest and the believed repercussions of committing this 'sin' (e.g. damnation of the soul, condemnation by society), incest has long been frowned upon and eschewed by people in many societies. Consciously committing it is unthinkable for many. In this discourse, the bio-power may be said to have normalized the non-practice of sexual relations between relatives, and in effect many societies or governments have governed the conduct of their whole populations in terms of their sexual practice and relation.

In his conceptualization of power, Foucault is concerned more with the constitutive effects of power rather than its source or its wielder, or its use for domination and oppression (Layder, 1994). Power for Foucault is productive and constitutive – developing in people certain capacities, identities, desires, etc and constructing social institutions. While power puts people in various relations, it also constructs their identities, capacities, and practices. This production of capacities and identities is possible because of people's constant entanglement in various discourses and practices, in which power is always present (Layder, 1994).

Power forms subjects. In the discourse on sexuality, for example, Foucault argues that various discourses on this subject matter are not really repressed as commonly believed. Instead, certain discourses about sex are proliferated, supported or initiated by such institutions as Christianity and medicine. These discourses eventually categorize and regulate sexuality in manners that they produce sexed subjects (Barker, 2003). For example, in many Christian and Westernized societies, sexuality or gender is generally believed to be either male or female. This has been chiefly proliferated and supported by Christian churches. Consequently, this defines an ideal sexuality and practice, regulating sexual conduct and producing subjects as either male or female.

Power/Knowledge

A key to understanding this concept of power is by examining how Foucault links power to knowledge. Foucault's concept of power is always intertwined with knowledge (thus his notion of power/knowledge). They are viewed as reciprocally constitutive. Through this attempt to link these two, knowledge has come to be viewed as never neutral and universal but historically specific and always enmeshed in questions and relations of power. For Foucault, knowledge is constructed within the conditions of relations and practices of power, eventually helping form, polish, and spread new techniques of power (Barker, 2003). In other words, the formation of knowledge and the exercise of power are always interwoven, and from there they refine and build up each other (Allen, 1999).

It is important to note here that Foucault has conceptualized power/knowledge within the context of discourse. It is discourse that provides means of thinking and speaking about a subject matter with recurring patterns of ideas, practices, and knowledge found in various locations of activity (Barker, 2003). It is, thus, within or through discourse that knowledge is formed and eventually, power is exercised.

Critique

Foucault's new conceptions of power have mostly been regarded in social sciences as a breakthrough account of the workings and nature of power – different from how it had previously (as proposed by influential political science theorists) been perceived, viewed, and studied. His is the antithesis of that concept of power as centralized, in the hands of one or a few entities, and negative (associated with domination and oppression).

Despite this, Foucault is said to have flirted with the old, influential notion of power as associated with domination (Karlberg, 2005) and, thus, centralized or coming from a centre (e.g. originating in the state). This is an acceptable assertion, yet it needs to be put and understood within the bigger context of Foucault's conceptualization of power.

Although Foucault views power as a kind of relation, thus pervading all types of relationships and the whole of society, he also deals with the question of resisting, or the need to resist oppression and dominance. Critical of Western capitalism's various forms of injustice, he highlights the need to examine the use of different forms of power for domination and the techniques used for oppression.

From a limited point, this may be viewed as diverging from his concept of power as relational and dispersed. But looking at it broadly, it may be counted as integrally part of this concept of power, but in terms of higher relations: those, for example, that involve relations between the state and its populations. Power is found in various locations, and this higher relation of power may be viewed as another field of such relation, where domination may be present. His emphasis on the issue of domination may be viewed as a stance that can be traced to, as already noted, his aversion to Western capitalist societies' various forms of oppression and his concern about understanding the mechanisms of power in modern societies.

This concern is better understood if put within the context of Foucault's conceptualization of power as used to govern people or regulate their conduct. Although this concept of government is something that can be found in various relations (e.g. government of self, parents' government of their children), Foucault pays special attention to how this works at the level of the state.

The term 'government' here, explains Hindess (1995), refers to "certain less spontaneous exercises of power over others…, and, particularly, to the use and invention of technologies for the regulation of conduct" (p. 106). In other words, 'government' here pertains to the regulation of conduct or behavior using various mechanisms or 'technologies' of power. As mentioned earlier, Foucault views states in modern societies as having assumed more the role of government. Instead of, for example, using force through laws, they have become more preoccupied with the conduct of their people, and they have been turned into a tool within the wider goals of government. Although this form of power does not involve the use of direct control (e.g. physical force), it does not mean that Foucault disregards altogether domination. This is a form of power that is exercised by governing, but it does not rule out the possibility or fact that it can or may be used to control or dominate others. What Foucault is trying to analyze is that in modern times, societies (especially Western) exercise power differently, that is by governing the conduct of others (e.g. the state governing its populations' conduct). In this government, domination may still be present, or may even be prevalent. But this is a form of domination that is exercised by determining or regulating others' conduct.

What can be considered as a basic shortcoming of Foucault's conceptualization of power is his failure to concretely nail down and elaborate on important concepts and issues of power. It is a major failing considering that his theorizing attempts have been meant to provide an alternative or better yet, a solution to the structuralist approach to power, particularly Marxist. Marxism generally conceptualizes power within its overarching use of and emphasis on the economic base or the mode of production. For Foucault, power does not stem from a chief source, e.g. the economic sphere; instead, it is dispersed in various locations and comes in more than one form.

This proposition is regarded as a central contribution to our understanding of power – providing us an alternative view and widening our knowledge of this phenomenon. However, Foucault has left many questions unanswered. For one, he fails to define what he means by power – what are its characteristics? How is it different from other phenomena? How does one have it? How does one lose it? Likewise, he does not give an account as to where it can be found and whether everyone has an equal chance to it.

As Layder (1994) correctly points out, instead of succinctly explaining what he means by power, Foucault proposes that his concept covers all fields and phenomena – giving the impression that it is able to fasten all things together. Because of this lack, he analyzes power without giving us a clear idea of what it really is and where it can be found. In his argument that power is everywhere, he fails to elucidate whether or not power is circulated equally in all areas of society. And if it is not (which is more likely because of his assumption that there are forms of domination in society), he as well fails to explain the foundations of those forms of domination. Layder (1994) postulates Foucault's fear of grand theorizing, and thus falling into the structuralist tradition, as the reason behind these central shortcomings. As a result, Foucault also fails to theorize on the differences (e.g. are some forms of power more significant than others? how?) between the various forms of power based on their locations. He attempts to provide specific explanations to the nature and workings of power, yet he is cautious not to offer a systematic account of this phenomenon (Layder, 1994).

The basic assumption that can be derived from Foucault's relevant propositions is only that power circulates everywhere and is pervasive. In effect, this gives the impression that power is simply scattered and does not have an order or organized configuration, for instance, as produced by certain institutions or elements (e.g. economic, legal). This conceptualization of power as dispersed, pervasive, and multifarious clashes with what Foucault himself envisages as somehow stable forms of domination that can be found in society (specifically Western capitalist societies). Layder (1994) argues that this is because stable forms of domination often involve organized basis or forms like a governmental system. So that domination will work, operating spheres of control are necessary. For example, for a government bureaucracy to ensure authority over a populace, it needs institutions or agencies (e.g. legal, fiscal) to regulate their conduct.

Layder also points out the failure to address the question of "who controls and exercises power" (1994, p. 108) as another deficiency of Foucault's analysis. Foucault views power as neither a commodity nor a possession. In effect, Layder argues, concurring with Best and Kellner (1991 cited in Layder, 1994), Foucault conceptualizes power as an impersonal force that is practised independent of the motive and actions of the individual.

We have to recall here that Foucault is opposed to any theorizing or analysis that puts the individual at the center, or views the individual as the source and focus of analysis. He sees the need to decentre the subject if we were to give accurate accounts of social phenomena such as power. We may attribute this to his concern to do away with the humanist subject. Nevertheless, this is a central weakness or neglect that further contributes to the vagueness of his propositions.

Had Foucault been more accepting of other theories, grand or not, he could have achieved more flexibility in his conceptualization of power; thus, he could have addressed the important issues that he has overlooked. For instance, had he taken more into consideration a humanist perspective in his attempt to explain power, he could have offered explanations as to who controls and employs power and how it is controlled and used. Another theory that he has failed to take into account is the structuralist approach to understanding power. Foucault has failed to factor in the role or the importance of a structural base in the working and circulation of power. The absence of this factor makes his explanation of power less acceptable, for how can power simply spread or circulate without any structure to serve as a basis?

This is supported by Layder's argument that the exercise of power through discourse (what Foucault considers as conduit of power) subsequently needs a structural foundation as a point of reference, serving as a footing for the circulation of power. This failure to factor in the need for a structural basis and the lack of definition of power are viewed as major deficiencies of Foucault's assumptions on power.

Best and Kellner (1991, as cited in Layder, 1994) assert that despite the new or alternative explanations Foucault puts forward on power, his analysis shrouds some pivotal facets of power. They specifically point out how it fails to shed light on how much power is still exercised by certain entities that hold political and economic power.

We may aver that Foucault does not altogether neglect this fact of power – how some agents still exercise more power than or over others. In *Power/Knowledge*, he calls on the need to examine the character of power, "towards domination and material operators of power" (Foucault, 1980, p. 102). Specifically he urges the turning of analyses of power to studying the methods and strategies of domination. In effect, this exemplifies Foucault's recognition of the various forms of domination existing in social networks. He, however, falls short in examining the workings of these forms of domination. For example, he fails to raise the issue of who controls and exercises power over others, and why there is disparity in the control and exercise of power.

Conclusion

Overall, Foucault's attempt to explain modern power is unsystematic and negligent of the important issues and components of power. It claims to provide a modern and comprehensive account yet fails to address the basic questions of power. His approach offers noteworthy and useful assumptions to understanding power, but it runs short of providing a clear account of various areas of this phenomenon. This shrouds his contributions to the study of the power, leading to his failure to give an acceptable alternative to the conceptualization and understanding of modern power.

Power has posed a social phenomenon that has been both elusive and enigmatic to analyze and understand. Yet it pervades all social relations that its scrutiny and understanding is a must in attempts to make intellectual inquiry of any germane social phenomena. What Foucault has put forward as his conceptualizations of power cannot be regarded as final and complete accounts of power. Nevertheless, they have laid foundations in understanding the modern forms of power. Further analyses, studies, and necessary refinements and interpretations need to be continuously carried out using these foundations for a more systematic, concrete, and informative understanding of this phenomenon. Doing these and developing new conceptualizations aptly fall in line with Foucault's concern to further unravel the modern configurations of power and his notion that knowledge is subject to change and should be challenged to produce more insightful inquiries and interpretations.

What can be briefly summed up of Foucault's take on power is put correctly by Layder: he has identified new attributes and forms of power and has revealed alternative means of knowing its effects. But he "has not revealed the 'true' face of modern power…" (Layder, 1994, p. 110).

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How Do Positive Life Changes Influence Men's Sexual Behaviour Change? Insights for HIV/AIDS Prevention

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Abstract

Recognizing the limited effects of cognitive changes on HIV sexual risk reduction, the non-cognitive contexts specifically life statuses and circumstances, had been investigated to understand their contribution to behaviour change. However, these characteristics were analyzed primarily in dichotomous and categorical terms. Interventions require more than research knowledge of the statistical significance of these variables if these were to effectively bring about changes in individual's risky practices. A qualitative exploration of the individual-based non-cognitive context of partner number reduction using personal interviews with 34 Filipino male participants of AIDS interventions was undertaken on the assumption that these life statuses and circumstances are dynamic This study examined how religiosity, love relationships, employment, and peers influenced the sexual partner number reduction of Filipino men enlisted as AIDS intervention participants. The major questions were: What were the changes experienced by men in any of these domains? How did these changes come about? How did these changes help the respondents in reducing the number of their sexual partners? The findings were discussed and from which several insights are generated to inform the future focus of HIV prevention.

Key words: AIDS intervention, life events, sexual behavior change

Introduction

Several theories have posited the role of intra-individual AIDS-related cognition as a multi-faceted proximal determinant in bringing about behaviour change (Catania et al., 1990; Prochaska et al., 1992; Fishbein et al., 1994; Rosenstock et al., 1994). Guided by the theoretical argument, AIDS interventions have thus utilized cognition in inducing partner number reduction (PNR). A review of 11 methodologically rigorous interventions mostly from the United States and some from five other countries provides data indicating that PNR has been approached predominantly from the cognitive standpoint, using such specific elements as knowledge, attitudes, intention, risk perception, and self-efficacy (Elwy et al., 2002).

While cognitive changes are recognized for their contribution to HIV risk reduction (Kelly et al., 1997; Kewley et al., 2002), their effects are small to moderate. A meta-analysis of 21 interventions disclosed that specific to PNR and relative to condom acquisition and use, the effects of cognitions are smaller (Jemmott and Jemmott, 2000). The modest impact on PNR mirrors the overall impact of cognition on sexual behaviour change in general. Cognitive models explain only 20% to 45% of variance in behaviour (Abraham et al., 1998). In a cohort study, the combined effects of individual and cognitive elements added, at most, 10%-20% to the proportion explained by baseline behavioural and socio-demographic factors (Ostrow et al., 1994). These findings underscore the fact that there are other unmeasured factors of sexual behaviour change in general and PNR in particular. Given the central role of behaviour change in HIV prevention, it behooves the research community to explore these factors. Much is unknown about the relative importance of many of the determinants of behaviour change and how to effectively modify sexual behaviour (Macintyre et al., 2001).

One area that has been bestowed a minimal amount of research and program attention, despite some reference to their impinging influence (Kayal, 1993; Friedman and Wypijewska, 1995), is the non-cognitive contexts of behaviour change. Having indirect effects, contextual variables are many and varied, and are operating at the individual, social, and structural levels (Hornick, 1990; Kayal, 1993; Rosenstock et al., 1994; Friedman and Wypijewska, 1995; Hankins, 1998; Castaneda, 2000; Warner and Leukefeld, 2001). Of these levels, the individual-level, non-cognitive explanations, specifically life statuses and circumstances, have been the most commonly investigated, primarily because it is manageable and easier to quantify. In relation to PNR, these characteristics have pertained to gender (Brown and Weismann, 1993; Cottler et al., 1998); age, ethnicity and sex work (Borus et.al., 1994); socio-economic status (Becker et al., 1998); partnership history (Jurich et al., 1992); HIV test results (Warner and Leukefeld, 2001); and peers (Kelly et al., 1997). These statuses and circumstances have been investigated quantitatively in dichotomous and categorical sense, thereby restricting the understanding of their contributions as a statistical problematique. Interventions require more than research knowledge of the statistical significance of these variables, if they were to effectively bring about change in individual's risky practices. Qualitative information, as it offers depth and elaborated responses, allows for an understanding of the specific mechanisms, through which life statuses and circumstances impinge on PNR.

In pursuing the exploration of the individual non-cognitive context of PNR, the assumption is that the afore-mentioned and other unexamined circumstances are not static, but rather developmental

(Petrocelli, 2002). Thus, in the course of the individual's engagement in AIDS interventions commonly lasting for three to 12 months (Alagad, 1996; Lee et al., 1997; Elwy et al., 2002), these characteristics may change, the movement and its processes of which have not been documented by previous studies. For instance, from being jobless, an intervention participant may find an employment; another may establish love relationship; and still another may turn religious. Life changes continuously occur as an important part of natural experience (Langston, 1994). Changes can be desired or positive, and undesired or negative (Ohaeri and Otote, 2002). Individuals who for the most part are self-organizing systems (Steenbarger, 1991) are predisposed to gravitate towards positive life changes (PLCs) in consonance with the positive enhancement of their AIDS-related cognitions and attitudes, which are being steered towards a direction, supportive of safe or safer sex practices.

The positive life changes or circumstances that a person undertakes to aid his sexual behavioural shift, may be one or several covering, among others, employment, marriage, living conditions, drug or alcohol use (Horney et al., 1995). Although frequently used in psychological research and criminal behaviour, the concept of PLCs is rarely, if at all, considered in HIV interventions; the focus tends to be on negative life changes. However, it should be noted that changes may play out differently from one person to another (Laub and Sampson, 1993), implying that any life change may induce the desired behaviour change like PNR.

As there is a broad range of life changes possible, the intent of this study was not to identify these transitions, but to zero-in on a few and to examine qualitatively how they exactly influenced PNR. The researcher/s decided to explore PLCs in four domains: religiosity, love relationships, employment, and peers. The research literature contains references stressing the interaction of peers with behaviour change, although much of it has yet to be used in AIDS interventions. For example, the nexus of peer group and its normative sexual behaviours is recognized as pivotal to individual behavioural transformation (Adler et al., 1990; Winslow et al., 1992; Kelly et al., 1997; Kelly, 1999; Hennink et al., 2000; Galavotti et al., 2001). The connection of other selected characteristics with sexual behaviour is unclear, but with respect to health behavioural outcomes in general, religiosity (Ellison and Levin, 1998), employment (Rich and Kim, 2002), and love relationships (Randolpf and Winstead, 1988; Sprecher, 2002) were underlined as significant. These domains were chosen also because their potential programmatic application for preventing the spread of HIV infections would not require as many resources as those required if domains were to involve drug and alcohol use or living conditions.

Towards the aim of generating insights for use in prevention efforts in the Philippines, this qualitative study examined how religiosity, love relationships, employment, and peers influenced the sexual partner number reduction (PNR) of Filipino men enlisted as AIDS intervention participants. The major questions were: What were the changes experienced by men in any of these domains? How did these changes come about? How did these changes help the respondents in reducing the number of their sexual partners?

Method

The study collected primary data in 2002 using semi-structured face-to-face interviews with 34 Filipino men. Respondents were participants of two AIDS interventions undertaken in the cities of Manila and Angeles City, with pronounced reduction in the number of their sexual partners. They were identified and recruited through the assistance of the organizations managing the interventions. Once recruited, respondents were informed about the study and its importance for HIV prevention, and also about confidentiality and anonymity.

The interview dwelt on two topics: the first focused on men's sexual behaviour change, the second on positive life events pertaining to religiosity, love relationship, employment, and peers as guided by the three major questions. Interviews, tape recorded and conducted in Philippine languages, took about an hour to complete and were held in offices, community centres, and vacant lots with audio privacy. Respondents were provided modest transportation and food allowance at the conclusion of the interview. Five male researchers conducted the interviews. Data were content analyzed.

Findings

Profile and Sexual Behaviour Change

Respondents were aged 25 to 34 years, single or married, either jobless or working as public utility vehicle drivers, construction workers, mechanics, sales clerks, or hotel and office personnel, with a monthly income of about US$150.

Prior to their enlistment in interventions, more than half (19) had three to six partners every month; others had two partners. Their partners comprised fairly equally of both paid and unpaid mates, the preponderant numbers of whom were regular female love relations. Respondents were more ever-non-users than ever-users of condoms (21 versus 13). Usage of condom was irregular.

When interviewed, during which their involvement in interventions already spanned about a year, all respondents were in a monogamous sexual relationship for a period of three to eight months. Their relations were mostly in an unpaid, regular, and stable heterosexual context, with ever-condom use being more common than uncommon (23 versus 11).

All had an accurate knowledge of AIDS. They recognized that having sexual intercourse without condoms, injecting drugs, transfusing blood, and breastfeeding are efficient modes of transmitting the virus. They also reported the most effective methods of preventing HIV infection (abstinence, condom use, partner number reduction, and non-intravenous drug use). Respondents stated that they did not know much about these before they reduced their partner numbers. Respondents varied in their assessment of personal vulnerability by saying they had no chance, or, low, moderate, or great chance of contracting HIV. Upon probing, respondents' assessment remained virtually the same before and after they minimized their partner number.

Positive Life Changes

Findings revealed that a little more than half of respondents (18) reported that they had one or two life changes that aided their behaviour change; about a third (12) reported three or four; four did not experience any. Changes were predominant with respect to respondents' religiosity (23), followed by love relationships (20), and then employment (16) and peers (16).

Religiosity

Respondents became religious or more religious as a result of their regular engagement in religious services, church choir, and charismatic movement. They said that their peers, families, loved ones, and church organizers encouraged them to participate in such activities. "My wife helped a great deal" was a statement several respondents mentioned in recognition of their wives' role in their religious transformation. One respondent, a regular attendee in religious services, confided that his intense religiosity at the time of the interview, although attributed to other people's persuasion, was hastened when God answered his prayers. He explained: "In my prayers, I asked for a life-time partner. God responded and gave me a partner to whom I should be faithful."

The switch of some respondents to other religious Christian denominations was a welcome experience for them, converting them and elevating their beliefs into a higher form of religiosity. One of these respondents elaborated: "I was a Catholic and was happy as one. However, I am happier now being a Born-Again Christian because I know God more."

The newly established or intensified religiosity had kept respondents away from their multiple sexual activities because they regularly attended their religious activities, which to several of them were also family and peer-centered. One respondent highlighted, "I was always with my family members whenever I attended religious services." Their continued receipt of and fulfillment of their need for spiritual support also helped contain their religious engagement. The provision of moral standards from religious leaders on issues like monogamy and loving one's family was likewise cited to have aided behaviour change.

Love relationships

Respondents fell in love, found true love, or their feelings towards their regular partner became more intense. Respondents who singled out love life as a source of influence thought that their special feelings for their partner were so uniquely different from the ones they had for others, which to some were "all about lust." They voiced out their descriptions of their love feelings. For some who experienced love for the first time, they said that it was 'love' because "they did not care how their partners looked," which was unlike their prior principle of "physical attributes counted first." Two married respondents confessed to loving their partner so much because according to them "she overlooked all my shortcomings and sacrificed a lot." For these men, it was "payback time" and their "payment" was in the form of true love. One respondent was "so happy to have met his partner" while another reiterated the genuineness of his feelings towards his partner: "If I don't have feelings for her, I will not care of what happens to her after sexual intercourse." Another respondent compared his feelings then and now: "I was happy before but not serious about love. Now I am happier because of the intensity of my present love feelings."

There were two ways how respondents developed or found their true love feelings. Either they discovered the feelings themselves or were helped by their loved ones. One respondent was unsure: "I didn't know how this feeling came about but I know this is for my wife."

As a result of their love feelings, respondents devoted their time to and performed activities exclusively with their partner - something that they failed to do previously owing to their pre-occupation with many partners. It was not just the feelings that mattered. Respondents said that they were drawn to regular relationships because these were also meeting their personal needs, these being the need for a regular companionship, and mutual care and support. A respondent confirmed a happy outcome of his love life because "we live together and help each other."

Employment

Under this domain, two changes were reported. Respondents sought and found an employment or they changed their work environment from bars and discotheques to offices. Respondents experienced these events on their own volition.

The first event bordered respondents' sexual relationships within the monogamous context because of work. Some could not stay late at night for their sexual activities because of the need to report to office the following day. Other respondents had too much pressure from work that left them with no time, much less energy for extra-dyadic sexual relationships. Thus, their daily trail saw them leaving home for work, and vice versa. "Quite tired and exhausted" was the phrase respondents used to summarize the depleting effects that paid work exerted on their energies. Job rigors were not a concern for other respondents who pointed instead to their fear of losing their livelihood as the reason why they had to be job-centered to the neglect or sublimation of their multiple sexual relations. Respondents bestowed premium on their work because they said it was part of their obligation and pressing social expectation to provide for their families.

For the interviewees who had a physical change of work environment, the move took them away from venues where access to sexual partners was of relative abundance, thereby enabling them to effectively reduce the number of their sexual partners.

Peers

Disassociation from "old" friends and association with a new set of friends, and reformation of friends' risky behaviour due to their collective involvement in AIDS interventions were the documented changes in this domain.

The dissolution of the "old" peer network was, to some respondents, an appropriate personal decision. They felt that their "old" friends were sources of direct or indirect pressure to engage in intercourse with multiple partners, or they served as models of "inappropriate" behaviors that also included non-sexual matters (drinking, smoking, gambling, and drug use). In the words of several respondents, their friends were "bad influence." The feeling appeared to be that their friends projected to them that "all things are okay" and there was no taboo. The peer-induced pressure and behavioural standards were partial reasons for respondents' decision to detach from their friends. The other reason pertained to the absence of peer support in periods of difficulties. One respondent said, "There are friends who really bring you towards foolishness or crazy things. However, when you get entangled with your problem, they are not ready to bail you out."

With their evolved or new set of peers, respondents spent time with them sharing stories, occasional drinking, watching movies, or playing sports and other board games. To respondents, their present crop of friends were a source of genuine friendship and companionship; "not only friends in fun, but friends in difficulties" was how two respondents defined the terms, whose activities were bordered mostly on "clean" fun. Respondents turned towards their friends as well as sources of advice and information, regarding matters about AIDS and safe sex practices. Current friendships were also characterized with openness and honest communication. Having experienced "new" friendships, two respondents tended to believe that "our friendship is strong because we could tell one another right from wrong." Contrasting his prevailing friendship with the past, a respondent noted, "The past was all about boasting and competition."

Discussion, conclusion and recommendations

AIDS research has investigated the contributions of negative and stressful life events to sexual practices (Kessler et al., 1991; Nott, 1999; Leserman, 2000; Martinez et al., 2002; Solorio, 2003) and behaviour change (Payn et al., 1997). Despite numerous recommendations and the potential of PLC to mediate in the enactment of PNR, no AIDS program and research has cast attention on the subject. The present study may be regarded as modest and an incipient contribution to the understanding of the roles of PLC on PNR and owing to its sample size, its findings may be applicable to the experiences of the 34 Filipino men interviewed.

Respondents' life changes differed across individuals, in that, while some had singular change, others had two or more changes. Some had changes in their religiosity and/or employment, others in love relationships and/or peers. Amidst these varying scenarios were the disparate ways in which respondents perceived their vulnerability; not all assessed themselves as vulnerable, although all changed. The foregoing highlighted the heterogeneity of pathways to behaviour modification. In particular, this insight stressed one crucial point: that the influence of life changes and/or cognitions was not absolute, but relative. Thus, there were instances in which PNR occurred in the midst of life changes and cognitive enhancement, and other instances in which behaviour change took place with life changes present and a cognitive element (perceived risk) lacking.

A summary of the reported life changes, moreover, underlined the non-singularity of change pathways. There was not just one but several categories of PLC, under each change of which was one or two specific experiences. These changes could be subsumed into five categories: affective, spiritual, economic, social, and spatial. The affective category included respondents' development of, or intensified love feelings, while the spiritual covered the formation of, or sustained religiosity, and change of religious group affiliation. The social category involved respondents' integration with a new social group, or the AIDS-related reformation of peer group. The economic category comprised respondents' first time employment, and under the spatial mobility category was a change in work environment. As could be gleaned, some changes under the same categories (affective and spiritual) differed, in that, for a few, these were their first experience, and for others, their subsequent but intensified experience.

Respondents experienced positive life changes on their own, or with social support. The economic and social changes were individually initiated. Spiritual events occurred upon the invitation and persuasion of peers, families, and religious leaders. Affective changes arose out of individual and/or dyadic efforts. The individual initiative to bring about these events was pushed because of self-identified needs: the need for employment and for a regular partner, and the need to change peers or religious affiliation and workplace. In this regard, the personal desire to experience particular events was conscious and intentional. In socially induced spiritual events, respondents had no explicit or implicit needs, nor a well-defined intention implying that people change without much reflection or prior intent (Littell and Girvin, 2002). Need identification and recognition emerged only after a process, wherein other individuals and significant groups had involved respondents in religious activities and the regularity the latter attended these, could have given them opportunities to contemplate and later, to recognize that they had a need for spiritual support. The stages appeared to be similar whether change occurred with or without professional assistance (Prochaska et al., 1992).

Regardless of the movements to experiencing positive life circumstances, self-directed or externally induced, these events were on the whole appraised as salient to the adoption of monogamy. Besides being monogamous, some respondents were also condom users, demonstrating that behaviour change was multi-directional (Kippax et al., 1993) and had depth. There were other aspects, however, of the substantive linkage between life events and behaviour change for which the study lacked answers, but in the purview of research, could be its prospective agenda. For example, "Were respondents' movements to undergo life changes helped in any way by their engagement in interventions and their consequent cognitive modification?" "Was sexual transformation preceded by life events or by cognitive changes?" "What was the potential interaction and dynamics between positive life events and cognitive improvement?" "Were the sexual behavioural effects of these events - as they transpired - sudden or gradual?" Notwithstanding these gaps, the study's findings pointed to distinct processes through which PLC constrained PNR.

First, affective, spiritual, and economic events bore the same effect in that all drew respondents to be preoccupied with their loved ones, religious activities or work. With their time and attention tied to these concerns, respondents were left without or with little opportunity to engage in intercourse with several partners. Second, social changes wherein respondents integrated themselves with a new set of friends or sustained their attachment with a reformed set of friends, paved the way for respondents to pursue leisure activities that, although peer-centred, were non-sexual. The predominance of non-sexual leisure norms among their friends, which meant the absence of group-based sexual norms and pressure, steered respondents' sexual behaviour shift towards monogamy. Third, respondents' transfer of work environment brought them to new workplaces where opportunities for sexual intercourse were not readily available. Lack of easy access had a dampening consequence on respondents' partner numbers.

PLC, therefore, functioned as "vehicles" on which respondents were "transported" to, or were more entrenched in specific social milieus. The concerns and activities of these milieus served as normative, competing, alternative and physical barriers to multiple sexual relationships. In theoretical and empirical literature, these mechanisms have been cited or confirmed as essential for behaviour change. Alternatives for problem behaviours are part of the counter-conditioning process specified in the action phase of the Stages of Change Theory (Prochaska et al., 1992). Normative behavioural control is embodied in the AIDS Risk Reduction Model (Catania et al., 1990). The physical or access barrier - avoiding particular places and venues was a change strategy among a sample of Australian men (Kippax et al., 1993).

The harboring and integrative mechanisms of positive life changes were strengthened with a provision of benefits to individuals. Using part of the typology of Ellison and Levin (1998), there were two beneficial outcomes. One, the milieus offered respondents social resources (family and dyadic ties; and economic, spiritual and moral support) which were fulfilling manifest and latent personal needs. On occasions, the resources were non-material with direct bearing on HIV prevention, for example, the value standard on monogamy that respondents received from religious leaders, and the information on AIDS and safer sex practices that they obtained from friends. These results confirmed that besides their indirect bearing, life changes did assume a direct role in HIV prevention. Two, the milieus established or enhanced a positive self-perception among some respondents, stemming from having built or strengthened love relationships, having found a job and meeting a social expectation, or having replaced their peers. In a sense, respondents could have improved their self-esteem and imbibed a feeling of personal mastery, control, and happiness. These positive outcomes were highly perceptible from respondents' quoted or summarized self-reports.

For a prospective consideration of PLCs in HIV prevention, a number of insights are offered here. First, interventions must promote a range of PLCs: from affective to economic, and spiritual to social, noting that these may be firsts to a number of participants while intensified for others. The program design must thus account for varying levels and dimensions of life changes. Recognizing that not everybody has a felt need for PLCs (no matter how socially positive and desired these are), interventions must introduce and engage participants in relevant activities. For instance, if individuals were to build a personal need to be religious, interventions must affiliate them with faith-based groups or activities. To enable participants to recognize the bad influence of friends and appreciate the value of changing these friends, they can be shown videos or involved in role-playing exercise where they can—in a detached manner—assess the negative effects of peer-based sexual norms on their sexual behaviour. These processes will provide individuals opportunities within which to perceive, contemplate and internalize the value of these life changes on which to form personal goals. The most successful interventions are tailored to individuals rather than limited to generic education, recommendations or advice (Fortenberry, 2002).

The ease of developing personal needs and goals will depend on the category of domains and changes. Absolutely, the promotion of and identification with a need for employment and economic concerns will be less difficult than those related with religion. In any case, interventions may form pertinent needs and goals by highlighting the social resources and personal rewards to be derived from engagement in these events, and stressing the negative consequences and costs of not adopting monogamous relationships. Numerous models highlight the integral role of comparing costs and benefits, or positive versus negative outcome expectations to usher in change (Catania et al., 1990; Prochaska et al., 1992; Galavotti et al., 2001).

Programs must transcend beyond need and goal identification and recognition. Needs must be translated into action. A gnawing gap between personal need and action is common knowledge in AIDS prevention. Interventions must enable individuals to enact PLCs for themselves. For instance, if they express a need to fall in love, persons must be introduced in predisposition situations. (Currently, AIDS interventions promote monogamy but do not offer guidelines on how to fulfill it). Also, the need for employment can be bridged into action if participants can be equipped with marketable abilities and skills or referred to employment agencies. Equipping participants with cognitive, affective, and other personal skills is a critical process towards moving their need and intention into action. Interventions must utilize significant social groups such as families and friends and other organizations like companies, religious and support groups for this purpose. Structural and social network and support are imperative to impel personal action (Odets, 1995; Catania et al., 1990).

A successful transformation of needs into initial action in the context of articulated goals must not be the final end of interventions. Programs must be aware that the intensity and strength of the constraining effects of PLC (as the effects of AIDS cognition) may not be sustainable: over time, these may wane. Factors contributing to initiating behaviour change may not be the same as those sustaining change (Pollak et al., 1992). Interventions must, therefore, craft sustaining strategies to address the possible numbing effects of life changes. One way to accomplish this is to revitalize PLC and their effects by periodically reviewing participants' attendant goals and benefits and upgrading these further. The findings underscored the point that intensifying effective and spiritual events were and could be instrumental to maintaining change.

The study has qualitatively demonstrated the mediating contributions of PLC to PNR. The effect is one of social integration: events entrenched individuals in milieus whose nature, elements, and processes confluence to re-shape sexual behaviour. The individual experiences in being integrated in social milieus were far from being uniformed; indeed the pathways through which life changes influenced behavioural movement were varied and multiple. It is this non-singularity of pathways that justifies the inclusion of PLC in HIV prevention. If changing behaviour treads various paths, the cognitive strategy may be more effective if it is coupled with the confluencing effects of PLC. The integration of PLCs will enable programs to harness these strategies in meeting the needs of participants whose sexual behavior change is only insufficiently induced by cognition, or to be enhanced by the combined effects of cognition and PLC. The structures for ushering in PLC are already in place in the natural environment; interventions can readily tap and transform them in ways so that these become more structured and accessible to individuals. The challenge lies in the fact that the amount of work to be made by interventions will be greater considering that the strategy will be more on psychosocial rather than individual psychology. At the theoretical level, the work will be less demanding: the principles governing how PLC works to affect behaviour change bear resemblance to those observed using the cognitive paradigm. At the research level, PLCs may have to be extensively studied to determine if these are part of the unmeasured non-cognitive factors, and whether their use-effectiveness in interventions has far-reaching consequences. Overall, the integration of PLC may broaden the appeal, social embeddedness, and impact of HIV prevention.

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Importance of Problem Definition and Improving its Effectiveness in Policy Making

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Abstract

This article will examine the importance of problem definition in policy making, as a foundation for subsequent stages of a policy cycle and as a communication and productivity tool in policy making. The importance of problem definition will be examined in terms of how it can prevent resource misallocation, facilitate savings and service improvements, reduce the scope of political disagreement and assist in the identification of the target group in a problem situation. The barriers to effective problem definition and how to overcome such barriers will also be investigated.

Key words: Policy cycle, problem definition, public policy

Introduction

Problem definition which is the initial stage in policy making (Weimer, 1998) characterizes a policy problem, by taking into consideration the causes of the problem situation and the stakeholders involved. As the initial stage in policy making, it helps solutions or options (Guess & Farnham, 2000).

Bardach (1996) identifies policy definition as an important part of policy analysis or policy-making process. Lehan (1984) estimates that the time spent on problem definition or diagnosis of policy problem should be at least four times that for the analysis of alternative courses of action or solutions in the policy marking process. This article aims to discuss (i) the importance of problem definition, (ii) the barriers to effective problem definition, and (iii) how to overcome such barriers.

Importance of problem definition

Foundation for subsequent stages of a policy cycle

As the first stage in the policy cycle, problem definition or the framing of a problem provides the basis for the subsequent stages in a policy cycle (Guess & Farnham, 2000). Russo and Schoemaker (2000) emphasize the importance of problem definition when they point out that “framing” (p. 38) is the “foundation of good decision-making process” (p. 21). They have argued that in problem definition, the adoption of frames or perspectives or mental structures, besides allowing for diverse ways of viewing the world, helps to simplify and guide our understanding of a complex reality.

Precise problem definition is therefore important for providing an overview of a problem and hence, guides the collection of evidence, searches for policy alternatives, design and implementation of solutions (Bardach, 2000). On the other hand, if a problem is not defined properly, it is likely to result in flawed or mis-formulation of policy solution with costly consequences. This can be seen in the example of Encyclopedia Britannica during the mid 1990s, when its sales plunged by more than half, following the advent of the CD-ROM technology (Russo & Shoemaker, 2002). The company inappropriately overused the mental framework or perspective of a print book publisher in defining and tackling the company's problem of declining sales. This caused the company to overlook the best options in the mode of delivery of its product in the age of infocomm technology. As a result, in 1995, the company's CEO had to resign (Russo & Shoemaker, 2002).

Communication and productivity tool

Besides providing the basis for subsequent stages of a policy cycle, problem definition is important for providing a structure to communicate and convince the recipient(s) of a policy analysis (Guess & Farnham, 2000). In addition to problem identification, the causes, objectives and target group are also identified. Appropriate problem definition enhances the policy analyst's effectiveness in communicating and selling his/her perspectives on a problem situation (Russo & Shoemaker, 2002). It facilitates the launch of a policy project; and, therefore, helps to increase productivity. For example, the Singapore government in its identification of the problem of inadequate retirement security for its aging population has facilitated the government's proposal for a compulsory longevity insurance scheme for Singaporeans below 50 years of age (Ng, 2007b). It has also helped the government foster the consultation process to gather feedback from the public on the problem and the action plan (Ng, 2007b), especially from those who would be affected by the policy proposal.

Identification of target groups

Another importance of problem definition is its function of facilitating the identification of target groups before the formulation and implementation of a policy (Guess & Farnham, 2000). This would contribute to facilitating a more focused approach in the subsequent stages of the policy cycle, especially when planned public expenditures are authorized by public laws to serve defined target population (Guess &

Farnham, 2000). For instance, the recent proposed compulsory longevity insurance scheme in Singapore, which is aimed at those below 50 years, is primarily to address the current trend of falling birth rate and increasing longevity which is expected to become more pronounced in future (Ministry of Manpower, 2007).

Prevention of resource misallocation

As there is a significant time lag between policy definition and implementation, there is potential risk of misallocation of valuable resources, particularly large amounts of public funds, towards solving the wrong problem, if the problem definition is flawed. Precise identification of a policy problem is hence important in preventing the misallocation of resources, whether be it money, manpower or time, and preventing the diversion of resources from more productive use (Guess & Farnham, 2000). For example, the problem definition of lax imprisonment terms for criminals instead of lack of comprehensive remedial programs for criminals may divert valuable resources towards the construction of more prisons which may not effectively rehabilitate criminals, especially hardcore criminals who have repeated offences (Guess & Farnham, 2000).

Savings and service improvements

In addition to preventing resource misallocation and wastage, accurate problem definition is important in enabling potential causes of a problem to be dealt with early enough. It can therefore result in monetary savings and improvement of service delivery to the public (Guess & Farnham, 2000). For example, the recent problem identification of an inadequate retirement security for an aging population in Singapore will help the country to prevent its aged citizens from becoming destitute through early intervention programs such as the proposed longevity insurance scheme (Ng, 2007b).

Reduction in the scope of political disagreement

Problem definition is also important in preventing political disagreements, including the sharing of costs and benefits of policy actions during the implementation phase of the policy cycle. It helps to facilitate mutual understanding and recognition by opponents of each other's views on a problem and hence, enables compromise (Guess & Farnham, 2000; Russo & Shoemaker, 2002). Problem definition also contributes to "redistribution of power" among stakeholders who are involved in the public policy making process (Weiss, 2000, p. 592). A good example is the problem definition of inadequate retirement security for an aging population in Singapore which is supported by empirical evidence from an independent source. A study by UN Population Division (2006) reveals that Singaporeans have a life expectancy of 80 years which is amongst one of the highest in the world, in contrast to the global average of only 67 years. It has helped to gain political acceptability on the existence of the problem as seen in the comments by Mr. Chiam See Tong, the opposition Member of Parliament in Singapore, on the "fact that people are growing older" and the "Central Provident Fund (which is Singapore's social security savings plan) is not inexhaustible ... for their old age" (Ng, 2007b, p. 1).

Overall, problem definition is important as it is the foundation for subsequent stages of a policy cycle. It also serves as a communication and productivity tool in the policy making cycle, prevents the misallocation of resources and facilitates service improvements. The process of problem definition also reduces the scope of political disagreement and facilitates the identification of target group in the policy making process.

Barriers to effective problem definition

The barriers to effective problem definition tend to be those involving vested interests from institutions and interest groups. They are mainly (i) the conceptual approach of analysts, (ii) institutional values and organizational culture, and (iii) ideology or value-based differences of analysts and clients of existing policy (Guess & Farnham, 2000).

The conceptual approach of the analyst may impede problem analysis by imposing a limiting perspective, especially if an analyst lacks a critical perspective. For example, an analyst may view high unemployment rate in a country as due to lack of foreign investment. However, the real underlying problem could be due to political instability in the country (Guess & Farnham, 2000).

Institutional values and organizational culture may also impede the effectiveness of problem definition. They may reinforce past policy positions and may even be used as a subtle means of denying their past failures. This can be seen in the example of US participation in the Vietnam war where successive problem definitions over time by its foreign policy institutions, such as State Department and CIA, have resulted in US support of a series of puppet regimes in South Vietnam and increased military participation to stop communist threatened "dominoes" from failing, at the expense of ignoring past lessons of the French debacle in Indochina (Guess & Farnham, 2000, p. 25).

The ideological or "value-based" barrier to effective problem definition can be seen in the example of a 1998 Clinton administration automobile safety initiative to increase seat belt usage based on an estimated benefit of 10,000 lives that will be saved per year (Guess & Farnham, 2000, p. 26). However, the policy initiative has been opposed by several African American lawmakers and American Civil Liberties Union as they anticipate that the enforcement of the law would lead to increased police harassment on the minorities. "White States" such as Washington and Colorado also oppose the proposed law due to individualistic sentiments that the government does not have the right to dictate what people should do (Guess & Farnham, 2000, p. 26).

Measures to overcome barriers to effective problem definition

The importance of problem definition as the basis for subsequent stages of a policy cycle makes it essential for a problem to be defined effectively in order for it to be useful. How can problem definition be made more effective? This section will discuss how the above barriers to problem definition can be overcome in order to make problem definition more effective.

Evidence of an actionable problem

Guess and Farnham (2000) considered a policy problem as a system of external conditions that produce dissatisfaction among different segments of the community. A policy problem is therefore characteristically an actionable problem that is defined by different groups of stakeholders, in the form of collective dissatisfaction and complaints and at the same time is supportable by evidence.

For a problem definition to be effective, there must be supportably empirical evidence which reduces biasness arising from the limiting perspectives, values or ideology of the analyst and decision makers. Empirical evidence provides rational facts on a problem situation and facilitates more convincing diagnosis and construction of problem definition (Bardach, 2000; Guess & Farnham, 2000). Conditions that cause a problem can themselves be problems (Bardach, 2000). By understanding the causes of a problem, is possible to throw more light on a problem situation. A better understanding of the problem situation will prevent unintended consequences at the implementation stage of a policy where wrong policy may be applied to a wrongly identified problem. For example, the situation of jail overcrowding could be due to factors other than increased violent crimes, such as increase in enforcement action against drug offenders (Guess & Farnham, 2000). Through the analysis of statistics on the profile of prisoners in terms of the types of crimes committed, whether they are petty, drug related or violent crimes, the problem definition for jail overcrowding could help to define more convincing and appropriate solutions.

Empirical evidence, including timely and accurate statistics, should be used to support any argument to show that a problem is not just an annoying one but an actionable public issue, meriting commitment, time and resources, including expenditure, personnel, a continuity of effort or development of procedure to reduce or eliminate an undesirable situation (Guess & Farnham, 2000). In Singapore, the problem of aging is supported by data from the Department of Statistics which reported that the support ratio of working adults between 18 to 65 years for 1 senior citizen above 65 years has declined from 23:1 in 1960 to 8:1 today and is expected to decline further to 4:1 in the year 2030 (Ng, 2007a). These data provide evidence of the scope of a problem and whether it is significant to be regarded as a policy problem.

In addition, for evidence to be useful, the use of comparative data from a similar jurisdiction helps to establish a norm (Guess & Farnham, 2000) and strengthen the evidence of a problem. A comparison to Singapore's problem of aging can be drawn from other countries, such as Italy, Germany, Denmark and Spain which are facing similar problem of aging (BBC, 2007).

Scope of a problem should not be defined too narrowly

Besides being supportable by empirical evidence, a problem should not be defined too narrowly to exclude related problems (Guess & Farnham, 2000). Otherwise, it may lead to a major cause of a problem situation to be overlooked. For example, crowded jails could be due to an increase in enforcement action against drug offenders rather than attributable only to an increase in violent crimes (Guess & Farnham, 2000). This may be overlooked if the problem is defined too narrowly by the assumption that imprisonment is due to violent crimes, which may result in other policy solutions such as rehabilitation being undermined.

Distinction made on the degree of complexity in a problem

In addition to avoiding defining a problem too narrowly, determining the degree of complexity in a problem also assists in the construction of an effective problem definition. A more complex problem would be harder to solve and hence will require a longer time frame. Policy makers should be aware of this rather than rush for a quick solution to gain short term public approval for their efficiency. For instance, the Clinton administration's ten-year drug policy was considered impractical for an intractable policy problem with a behavioural foundation which required more than just a quick solution (Guess & Farnham, 2000). Otherwise, more severe penalties resulting from a too ambitious drug abuse prevention policy could be discouraging or frustrating to those affected (Guess & Farnham, 2000).

Inclusion of the views of various groups of stakeholders

Apart from making a distinction on the degree of problem complexity, the sensitivity to different perspectives and interests of different stakeholders by permitting them to exercise and express value judgment will also help to enhance the effectiveness of problem definition. It will help to reduce resistance during the implementation stage of the policy and prevent biasness and the problem from being defined by powerful industry interest groups and the disproportionate distribution of costs and benefits among affected interest groups (Guess & Farnham, 2000). For example, if only prison construction and engineering industries are consulted on the undesirable situation of crowed jails, they may attribute it to the problem of too few prisons, instead of other more compelling causes (Guess & Farnham, 2000).

The importance of taking into account the values of stakeholders is also highlighted by Weimer (1998) in his craft approach to policy analysis. He places importance not only on rational/ empiricist methods which take into account similar problems addressed in other times and places, but also discourse and interpretive aspects of problem definition which require creativity. Values can then be uncovered and policy decision can be more enlightened and informed (Weimer, 1998). A good example is the decision to open a casino in Singapore. The Singapore government in its deliberation to legalize casino gambling, has looked at the experience of other countries like UK, US and Australia in managing and stamping out undesirable vices like prostitution and illegal money laundering in their casinos (Wong, 2005). The government has also consulted religious bodies, by gathering feedback from the Catholic Church, the National Council of Christian Churches and Muslim groups and the general public on their concerns. It has engaged and sought the understanding and co-operation of religious bodies in addressing the issue of gambling addiction (Lim, 2005).

Use of problem structuring techniques

Besides, the soft skills of consulting stakeholders, the use of appropriate problem structuring techniques, such as classification analysis involving data gathering, attention to trends and the categorization of data, also assist in the construction of an effective problem definition and help decision makers to see problems in new or more practical ways (Guess & Farnham, 2000).

Brainstorming is another problem structuring technique which can be used to enhance the identification and conceptualization of problems through group dynamics and creativity as opposed to the more rational and empirical approaches of techniques such as social science methods (Rebori, 1997). A brainstorming group ideally comprises experts from various professions who have knowledge of the sources of public dissatisfaction regarding an issue. The idea generation process is separate from the idea evaluation stage. Instead of treating a problem as single dimensional, brainstorming facilitates the definition of a multidimensional problem which can lead to more innovative solutions, including hybrid policies. For example, drug offences instead of jail term, may include the legalization of drugs, provision of treatment and regulation of drugs which are hybrid policies (Guess & Farnham, 2000).

Generally, factors which can assist effective problem definition include the evidence of an actionable problem, the avoidance of defining a problem too narrowly, making a distinction on the problem complexity, inclusion of various stakeholders in the problem definition process and the proper use of problem structuring techniques.

Conclusion

In summary, problem definition is an important tool in policy making as it provides the foundation or basis for subsequent stages of a policy cycle, and functions as a communication and productivity tool in policy making. Proper identification of policy problems would prevent resource misallocation, facilitate the efficient allocation of scarce resources, and improve service quality. This could, in turn, reduce the scope of political disagreement and assist in the identification of the target groups. The barriers to effective problem definition are primarily limitations imposed by the conceptual approach of the analysts, institutional values and organisational culture, and the ideological or value-based differences of analysts and clients of existing policies. Problem definition can be made more effective by overcoming such barriers through the reliance on empirical evidence of an actionable problem and use of problem structuring techniques to overcome institutional values and organisational culture. The inclusion of the views of stakeholders helps to overcome ideological or value-based barriers which can avoid defining a problem too narrowly and differentiate the degree of complexity in a problem. Thus, any limitations inherent in the conceptual approach of the analysts can also be overcome.

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The Three-Component Model of Organizational Commitment in Thailand

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Abstract

Few extant studies have attempted to investigate organizational commitment outside North American and Western societies. The current study was designed to address this void in the literature by examining the construct validity of the three-component model of organizational commitment (Meyer & Allen, 1991) in the context of Thailand. Using a sample of 517 academics from six universities, results of confirmatory factor analysis indicated that the three-factor model provided significantly better fit to the data than did the alternative models. Limitations of the study, directions for future research, and implications of the findings are discussed.

Key words: Construct validity, Meyer and Allen's three-component model, organizational commitment, Thailand

Introduction

Organizational commitment has received a great deal of attention in the organizational psychology literature in the past few decades (cf. Benkhoff, 1997; Mathieu & Zajac, 1990). Research interest in organizational commitment is primarily due to its relationships with a number of work outcomes including work attendance, job performance, organizational citizenship behavior, and turnover (see Mathieu & Zajac, 1990; Meyer & Allen, 1997; Meyer, Stanley, Herscovitch, & Topolnytsky, 2002). With considerable research attention given to organizational commitment, this construct has been conceptualized in various ways and treated either as an unidimensional construct (Becker, 1960; Buchanan, 1974; Mowday, Porter, & Steers, 1982; Mowday, Steers, & Porter, 1979; Porter, Steers, Mowday, & Boulian, 1974; Wiener, 1982) or multidimensional construct (Allen & Meyer, 1990; Kanter, 1968; Mayer & Schoorman, 1992, 1998; Meyer & Allen, 1984, 1991, 1997; O'Reilly & Chatman, 1986). In their reviews of the organizational commitment literature, Meyer and Allen (1991, 1997; Allen & Myer, 1990) proposed three components of organizational commitment that integrated a number of earlier diverse conceptualizations.

These three forms of organizational commitment were identified as affective, continuance, and normative commitment. Affective commitment refers to the employee's emotional attachment to, identification with, and involvement in the organization. Continuance commitment refers to an awareness of the perceived costs associated with leaving the organization. Normative commitment refers to a feeling of obligation to continue employment. Given their conceptual differences, Meyer and his associates (Allen & Meyer, 1990; Meyer & Allen, 1997; Meyer, Allen, & Smith, 1993) developed scales to measure these three commitment constructs, referred to as the Affective, Continuance, and Normative Commitment Scales, hereafter ACS, CCS, and NCS, respectively.

To date, Meyer and Allen's (1991) three-component model of organizational commitment has received considerable research support and is "now fairly well established in the commitment literature" (Meyer & Herscovitch, 2001, p. 308). Nevertheless, the three-component model and measures for each component have been developed in North America and have been tested mostly in Western countries (Allen & Meyer, 1996; Ko, Price, & Mueller, 1997). Allen & Meyer (1996) suggested that the investigation of organizational commitment across cultures was necessary to ascertain the validity and applicability of the multidimensional conceptualization. Similarly, Ko et al. (1997) investigating the three-dimensional organizational commitment concept in South Korea suggested that "additional studies conducted in other Asian societies are needed to provide more information pertinent to conceptual distinctions in the West and Asia" (p. 971).

The American and Thai people are likely to differ across four dimensions of national culture: power distance, uncertainty avoidance, masculinity versus femininity, and individualism versus collectivism (Hofstede, 1980). According to Hofstede's cultural map, the U.S. scores low on power distance, high as an individualist culture, low on uncertainty avoidance, and high on masculinity. Comparatively, Thailand ranks high on power distance, high as collectivist culture, high on uncertainty avoidance, and high on femininity. Differences between the cultures in the way people perceive and interpret their worlds may influence the levels of organizational commitment (Andolšek & Štebe, 2004). Thus "extending research on organizational commitment to other borders is important" (Cheng & Stockdale, 2003, p. 466). The current study seeks to make a contribution to the organizational commitment literature by carrying out research in Thailand, a society culturally different from the Western context. The aim of the study is to examine the construct validity of the three-component model of organizational commitment (Meyer & Allen, 1991) in a Thai setting.

Several empirical studies conducted in Western settings have reported evidence in support of the construct validity of the three-component model of organizational commitment (e.g., Allen & Meyer, 1990; Dunham, Grube, & Castañeda, 1994; Hackett, Bycio, & Hausdorf, 1994; Meyer et al., 1993). The factor structure of the commitment measures has also been examined in other cultural contexts including China (Chen & Francesco, 2003; Cheng & Stockdale, 2003), Korea (Ko et al., 1997; Lee, Allen, Meyer, & Rhee, 2001), Nepal (Gautam, Dick, & Wagner, 2001), Pakistan (Tayyeb & Riaz, 2004), and Turkey (Cetin, 2006; Wasti, 2003). Consistent with previous research conducted in the West, the majority of empirical studies conducted in non-English speaking environments have provided evidence to suggest that affective, continuance, and normative commitment are distinguishable constructs (e.g., Chen & Francesco, 2003; Gautam et al., 2001; Lee et al., 2001; Tayyeb & Riaz, 2004; Wasti, 2003). Hence, it is expected that similar results would be found in the Thai setting, i.e., ACS, CCS, and NCS measure distinct constructs.

The following section presents details on the methodology used to conduct the investigation. It describes the sample, data collection procedures, non-response, measurement of the variables, and the method of analysis. This is followed by the results of the statistical analysis and a discussion of the findings of the current study. The limitations of the study are then outlined. Finally, the relevant directions for further research are suggested.

Method

Sample and Data Collection

The purpose of the current study was to examine the construct validity of the three-component model of organizational commitment (Meyer & Allen, 1991) in the context of Thailand. The sample was drawn from three public and three private universities in Thailand that were willing to take part in the study. Questionnaires were disseminated to 1,300 full-time academics by a research representative of each university who was not associated with the project. A cover letter explained to the participants the purpose of the study and addressed issues relating to voluntary participation, confidentiality, and anonymity. Participants were asked to seal the completed questionnaires in a provided envelope and return it to the respective research representative. Of 543 returned questionnaires, 26 (2%) were discarded due to inordinate missing data for use, leaving 517 usable questionnaires (response rate = 39.77%). As Table 1 indicates, of the respondents, about 64.4% were women and 35.6% men. Three-quarters (76.1%) held a master's degree. Around 41.6% aged between 25-34 years. The rest of the age groups contained roughly even distribution of between 8.2 – 12.9% except for 3.3% of those respondents younger than 25 and 3.9% at the age 60 or older. In regard to academic rank, 75.3% of the respondents were lecturers, 15.7% were assistant professors, and 9% were associate professors. No respondents were professors in this sample. Finally, most of the respondents reported working in their current university for up to 10 years (63.6%) and had teaching experience for up to 10 years (57.8%).

Non-response

In the current study, it was not possible to compare respondents and non-respondents because non-respondents could not be identified. Hence, it is not known if the respondents differed demographically from the non-respondents. Nevertheless, Armstrong and Overton (1977) have suggested that comparisons with known values for the population would be a useful approach to estimate non-response bias. The dissimilarity of demographic characteristics between the survey sample and the population of interest indicates evidence of bias (Hennigan, Maxson, Sloane, & Ranney, 2002). Given that population parameters are unavailable, the current study applied Armstrong and Overton's suggestion by comparing demographic characteristic of the respondents with those of the academics working in faculties in which the questionnaires were distributed (see Table 2). The analysis was performed against relevant demographic characteristics data collected from faculty records. Examination of the chi-square tests found no significant demographic differences between the two groups in terms of gender (χ^2 (1) = 3.49, $p > .05$), educational level (χ^2 (2) = 5.61, $p > .05$), or organisational tenure (χ^2 (6) = 2.99, $p > .05$). The one exception was the academic rank where a significant difference was found (χ^2 (3) = 8.30, $p < .05$). It appeared that there were slightly more lecturers than both assistant professors and associate professors, and no professor participated in the study. In Magner, Johnson, and Elfrink's (1994) study, academic rank was not significantly correlated with organisational commitment. Given this finding, it was determined that there were no serious selection problems and, thus, the sample may be representative of the population it is intended to portray.

Measures

The three forms of organisational commitment were measured by the instruments developed by Meyer and Allen's (1997) (ACS, CCS, and NCS). These instruments, and their modified/shortened versions, have produced reliability coefficients ranging from .47 and .91 in previous research conducted in Non-English speaking environments including China

(Chen & Francesco, 2003; Cheng & Stockdale, 2003), Korea (Ko et al., 1997; Lee et al., 2001), Nepal (Gautam et al., 2001), Pakistan (Tayyeb & Riaz, 2004), the United Arab Emirates (Yousef, 2000), the Sultanate of Oman (Kuehn & Al-Busaidi, 2002), Jordan (Suliman & Iles, 2000), and Turkey (Cetin, 2006; Wasti, 2003).

Note that while affective commitment and continuance commitment were measured using original 8-item ACS and CCS respectively, normative commitment was measured via a revised 6-item NCS in the current study. Responses to these scales were made on 7-point scales ranging from (1) *strongly disagree* through to (7) *strongly agree*. The Cronbach alpha was .78 for ACS, .73 for CCS, and .66 for NCS. Although the NCS did not reach the recommended minimum threshold of .70, the low reliability is acceptable in the early stage of theory testing (Nunnally, 1978). It is suggested that the use of the NCS meets the criterion of early theory testing because "the commitment components were not studied extensively in non-Anglo countries" (Glazer, Daniel, & Short, 2004, p. 330).

As the current study was conducted in a Thai-speaking context, the questionnaires were translated from English into Thai, following the procedure recommended by Brislin (1993). First, the questionnaires were translated from their original English version into Thai by the researcher. Second, a back-translation of the instruments into English by a bilingual person was performed. Finally, the back-translated text was compared with the original text, and discrepancies between those two versions were resolved through discussion between translators. This translation procedure was used to examine and ensure translation equivalence in both versions.

Confirmatory Factor Analysis

To determine whether the three organisational commitment scales measured distinct constructs, confirmatory factor analyses were performed using the maximum likelihood estimation method in LISREL 8 (Jöreskog & Sörbom, 1993). The confirmatory factor analysis procedure involved the comparison of a series of nested models (cf. Bollen, 1989). Specifically, a three-factor model (affective, continuance, and normative commitment items separately loading on three factors) was compared with a one-factor model (all organisational commitment items loading on one factor) and a two-factor model (affective and normative commitment items defining one factor and continuance commitment items defining the other). Inclusion of the two-factor model was based on the findings of Ko et al. (1997) and Meyer et al. (1993) that ACS and NCS were highly correlated. Specifically, Meyer et al. found a correlation of .74 and Ko et al. reported correlations of .73 (sample 1) and .84 (sample 2) between affective commitment and normative commitment.

Results

Table 3 presents the fit statistics for each of these models, as well as results of chi-square tests used to compare alternative models with the three-factor model. Comparison of results indicated that the three-factor model provided the best fit. For instance, the three-factor model was the only one in which the comparative fit index (CFI) and incremental fit index (IFI) reached the conventional standard of .90 (Hoyle & Panter, 1995; Hu & Bentler, 1999; Tabachnick & Fidell, 2001). In addition, the normed fit index (NFI) of .87 and non-normed fit index (NNFI) of .88 for the three-factor model were also very close to .90, a benchmark of good overall fit (Bentler & Bonett, 1980; Kelloway, 1998). The goodness of fit index (GFI) value of .84 fell slightly below the desired threshold of .90 (Cuttance, 1987). Although the two-factor model yielded similar results on a variety of fit indices as those of the three-factor model, results of chi-square difference tests indicated that the three-factor model provided significantly better fit to the data than did the one- and the two-factor alternatives. Finally, the three-factor model presented the lowest root-mean-square error of approximation (RMSEA) and standardized root-mean-square residual (SRMR); although the former fell slightly outside the acceptable range of .05 to .08 (Browne & Cudeck, 1993), the latter was less than the upper threshold of .10 (Kline, 2005).

The standardised factor loadings for the measurement of the three-factor model are presented in Table 4. The results indicated that the ACS items, the CCS items, and the NCS items loaded appropriately on three separate factors. However, some items displayed low factor loadings. For instance, the factor loadings of AC2 (.32), CC5 (.26), and NC6 (.39) were relatively low. More serious was the fact that each dimension had one item exhibiting extremely low factor loadings. AC3 loaded only .17 and CC6 and NC1 loaded only .19.

Table 5 presents the means, standard deviations, and correlation coefficients between variables. Affective commitment was strongly correlated (r = .60, $p < .001$) with normative commitment. Continuance commitment was weakly correlated (r = .18, $p < .001$) with affective commitment and moderately correlated (r = .30, $p < .001$) with normative commitment.

Discussion

As demonstrated in Table 3, the results of confirmatory factor analysis provided support for the argument that the ACS, CCS, and NCS measured different constructs, confirming the construct validity of the three measures. This evidence of the distinction among the three organisational commitment measures conformed to results of confirmatory factor analyses reported by previous research conducted in the West (e.g., Allen & Meyer, 1990; Dunham et al., 1994; Hackett et al., 1994; Meyer et al., 1993) and other cultural contexts (e.g., Chen & Francesco, 2003; Gautam et al., 2001; Lee et al., 2001; Tayyeb & Riaz, 2004; Wasti, 2003).

Consistent with previous research (e.g., Ko et al., 1997; Lee et al., 2001), some items displayed low factor loadings in the current study. According to Hinkin (1995), factor loadings for reverse-scored items are often lower than positively worded items that loaded on the same factor. With exceptions for AC2 and AC3, the fact that the four items (i.e., CC5, CC6, NC1, and NC6) with the lowest factor loadings were reverse-scored items appeared to support this notion. Another potential explanation for low loadings may be related to translation issues. Despite the employment of a standard translation procedure (Brislin, 1993), it neither guarantees that items have equivalent connotative meaning (Lee et al., 2001) nor prevents culturally specific misunderstandings (Andolšek & Štebe, 2004). According to Tayyeb and Riaz (2004), it is not always easy to retain the true meaning of items when they are expressed in a language other than that in which the instrument was originally created. Thus, it is possible that Thai translation failed to take account of all possible nuances in the English language causing Thai academics to interpret these items differently from what was expected.

It is noteworthy that although the results of confirmatory factor analysis revealed that the three organisational commitment scales were distinguishable, they were correlated to some extent. In particular, a strong correlation between affective and normative commitment was identified ($r = .60$, $p < .001$) (see Table 5). However, this correlation was less than .70 (Tabachnick & Fidell, 2001) and therefore multicollinearity was not a concern. Correlations of this magnitude are not unusual in organisational commitment research (see e.g., Cetin, 2006; Chen & Francesco, 2003; Cheng & Stockdale, 2003). In fact, a recent meta-analysis by Meyer et al. (2002) revealed an average correlation of .63 between affective commitment and normative commitment.

Limitations and Future Research Directions

The current study examined the three-component model of organizational commitment in the Thai context, which is very different from Western cultures, and thus contributes to understanding organizational commitment from a cross-cultural perspective. Despite the fact that some items displayed low factor loadings, the current study provided support for the construct validity of Meyer and Allen's (1991) three-component model in Thailand. Using a sample of 517 academics from six universities, the results of confirmatory factor analysis indicated that the three-factor model provided significantly better fit to the data than did the one- and the two-factor alternatives. The findings and the contribution of the current investigation, however, must be evaluated, taking into account the limitations of the study. First, the current study was conducted in a single Asian culture. In future research, it would be of interest to replicate this study in more than one country to examine the generalizability of the three-component model in other non-Western cultures. Second, in the present study, the measures were translated from English into Thai with as little modification as possible. It is plausible that the low factor loadings may reflect interpretation difficulties with some of the scale items, rather than the constructs themselves. That is, some of the original items may not translate properly, or certain items may contain content that is not relevant to the constructs in the Thai context (cf. Lee et al., 2001). In addition, as mentioned previously, these low loadings may be related to reversed-scored items (Hinkin, 1995). Consequently, despite the results of confirmatory factor analysis validating the three components of organizational commitment in Thailand, Meyer and Allen's (1997) instrument warrants future cross-cultural research attention. Finally, the dimensionality of continuance commitment was not examined in the current study. Previous studies conducted in Western settings have found that continuance commitment consists of two related dimensions: lack of alternatives and high personal sacrifice (e.g., Dunham et al., 1994; Hackett et al., 1994; Meyer, Allen, & Gellatly, 1990). These studies also found that the two dimensions were highly correlated. The dimensionality of continuance commitment was assessed in other non-Western cultures. For example, using data from South Korea, the findings of Ko et al.'s (1997) study suggested that continuance commitment should be treated as unidimensional, while Lee et al. (2001) concluded that continuance commitment has two sub-dimensions. Given these contradictory findings, future research should examine the dimensionality of continuance commitment in Thailand as well as in other non-Western countries.

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Table 1: Demographic Characteristics of Respondents

Demographic variable	Total sample (*N* = 517)				
	%	Mean	*SD*	Min	Max
Gender		1.36	.48	1	2
Female	64.4				
Male	35.6				
Age		4.41	2.22	1	9
Under 25 years	3.3				
25-29	22.4				
30-34	19.2				
35-39	10.0				
40-44	12.9				
45-49	10.8				
50-54	9.2				
55-59	8.2				
60 or over	3.9				
Educational level		2.07	.48	1	3
Bachelor's degree	8.4				
Master's degree	76.1				
Doctorate degree	15.5				
Academic rank		1.34	.64	1	3
Lecturer	75.3				
Assistant Professor	15.7				
Associate Professor	9.0				
Organizational tenure		3.25	1.91	1	7
Less than 2 years	21.8				
2 up to 5 years	19.6				
5 up to 10 years	22.2				
10 up to 15 years	11.8				
15 up to 20 years	8.4				
20 up to 25 years	6.1				
25 years or greater	10.2				
Professional tenure		3.49	2.00	1	7
Less than 2 years	19.1				
2 up to 5 years	19.1				
5 up to 10 years	19.6				
10 up to 15 years	12.0				
15 up to 20 years	9.8				
20 up to 25 years	6.9				
25 years or greater	13.6				

Table 2: Comparison of the Demographics of the Respondents (*N* = 517) and the Academics in Faculties from Participating Universities (*N* = 1,954)

Demographic variable	Academics in participating universities %	Respondents %
Gender		
Female	60.39	64.4
Male	39.61	35.6
Educational level		
Bachelor's Degree	11.76	8.4
Master's Degree	72.70	76.1
Doctorate Degree	15.54	15.5
Academic rank		
Lecturer	71.19	75.3
Assistant Professor	17.41	15.7
Associate Professor	10.35	9.0
Professor	1.05	0.0
Organisational tenure		
Less than 2 years	20.15	21.8
2 years up to 5 years	19.33	19.6
5 years up to 10 years	22.42	22.2
10 years up to 15 years	14.10	11.8
15 years up to 20 years	7.98	8.4
20 years up to 25 years	5.64	6.1
25 or greater years	10.38	10.2

Table 3: Comparison of Alternative Confirmatory Factor Analysis Models

Model	X^2	*df*	ΔX^2	RMSEA	SRMSR	GFI	NFI	NNFI	CFI	IFI
One-factor	2,075.65***	209	1,027.95***	.130	.110	.73	.79	.79	.81	.81
Two-factor	1,148.23***	208	100.53***	.094	.092	.83	.86	.88	.89	.89
Three-factor	1,047.70***	206	-	.089	.090	.84	.87	.88	.90	.90

Note: *N* = 517. X^2 = chi-square measure of discrepancy; *df* = model degree of freedom; ΔX^2 = the difference in X^2 compared with the three-factor model; RMSEA = root-mean-square error of approximation; SRMSR = standardised root-mean-square residual; GFI = goodness of fit index; NFI = normed fit index; NNFI = non-normed fit index; CFI = comparative fit index; IFI = incremental fit index.

One-factor = all organisational commitment items loading on one factor; Two-factor = affective and normative commitment items loading on one factor and continuance commitment items loading on the other; Three-factor = affective, continuance, and normative commitment factors.

*** $p < .001$.

Table 4: Confirmatory Factor Analysis of 22 Organisational Commitment Items

	Items	AC	CC	NC
AC1	I would be very happy to spend the rest of my career with this university	.60		
AC2	I enjoy discussing my university with people outside of it	.32		
AC3	I think I could be easily become as attached to another organisation as I am to this one	.17		
AC4	I really feel as if this university's problems are my own	.67		
AC5	I do not feel like "part of the family" at my university	.55		
AC6	I do not feel a strong sense of belonging to my university	.68		
AC7	I do not feel "emotionally attached" to this university	.72		
AC8	This university has a great deal of personal meaning for me	.80		
CC1	Too much in my life would be disrupted if I decided I wanted to leave my university now		.58	
CC2	I feel that I have too few options to consider leaving this university		.73	
CC3	It would be very hard for me to leave my university right now, even I wanted to		.58	
CC4	Right now staying with my university is a matter of necessity as much as desirable		.56	
CC5	I am not afraid of what might happen if I quit my job without having another one lined up		.26	
CC6	It would not be too costly for me to leave my university right now		.19	
CC7	One of the few serious consequences of leaving this university would be the scarcity of available alternatives		.63	
CC8	One of the major reasons I continue to work for this university is that leaving would require considerable personal sacrifice – another organisation may not match that overall benefits that I have here		.49	
NC1	I do not feel any obligation to remain with my current university			.19
NC2	This university deserves my loyalty			.70
NC3	I would be feel guilty if I left my university now			.48
NC4	Even if it were to my advantage, I do not feel it would be right to leave my university now			.60
NC5	I owe a great deal to this university			.68
NC6	I would not leave my university right now because I have a sense of obligation to the people in it			.39

Note: Factor loadings are based on completely standardised solution results: AC = Affective commitment; CC = Continuance commitment; NC = Normative commitment.

Table 5: Means, Standard Deviations, and Correlation Coefficients between Variables

Variable	Mean	*SD*	1	2
1. Affective commitment	39.96	7.43		
2. Continuance commitment	31.17	7.89	.18***	
3. Normative commitment	27.84	6.04	.60***	.30***

Note: $N = 517$. ***$p < .001$.

Realism, Liberalism, and Change in the International System

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Abstract

This paper reviews the main ideas of realism and liberalism in the context of change in the international system with particular reference to the war on Iraq. It argues that realist principles have a strong explanatory power of the 'change' although they are not popularly utilized by politicians at least in their public pronouncements.

Key words: International system, liberalism, realism

Introduction

'Change' is inevitable in international relations. In Huntington's thesis on 'The Clash of Civilizations', the reasons for conflicts among nations have *changed* from conflict between princes to conflict between nations, to conflict between ideologies, and to clash of civilizations (Huntington, 1993). On the political front, it is useful to anticipate any discontentment arising from countries and their citizens around the world, and adopt relevant measures to prevent the problem from escalating further. But this is easier said than done. The United States, for example, has feared terrorists attacking its soil for a long time but it did not do much to deal with the problem prior to the September 11, 2001 incident (Leffler, 2003, p. 1048). Table 1 outlines some of the major changes in the international system from the medieval period to the modern and post-modern systems, as explained succinctly in Huntington (1993), Scholte (1997) and Buzan and Little (1999). The transition from the Cold War to clash of civilizations offers a new challenge to nation states. Unlike the former where a nation knew well who or what it was fighting, the latter clashes involve terrorist and extremist groups that normally belong to no specific country.

Table 1: Significant changes in the international system

Event	Remarks
Pre-1648 (Medieval form)	- main actors include churches, empires, religious orders, aristocratic estates, etc.

	- boundaries were frontier zones where authorities faded away and sovereign was dispersed - different aspects of governance located in different actors
Westphalia system (1648) - derived from the Peace of Westphalia - marked the transformation of international system from medieval to modern form	- according to Buzan and Little (1999), the Westphalian international system followed two principles (a) Principle of statehood - world was divided into territorial boundaries which were ruled by separate governments - the state enjoyed a legal monopoly to control the area of its jurisdiction (b) sovereign - the state can exercise (i) comprehensive (jurisdiction covered all affairs in the country), (ii) supreme (the state has the final say), (iii) unqualified (state's right to control was unquestionable) and (iv) exclusive (the state did not share competences), control over its designated territorial domain. - Westphalian system was considered the model for the realist paradigm - the political structure was anarchic because nation states seek exclusive sovereignty - nation states strive for power to survive - the pursuit for power was associated with military intervention and competition
Cold war period (from end-of-WWII to the breach of Berlin Wall in 1989)	- for realists, the end of Cold war reflected as a shift in the power structure of the international system - for liberalists, the Cold War represented ideological battle between capitalism and communism from which the former emerged as victor - Buzan and Little (1999) outlined two reasons why political-military politics were no longer dominant as Cold War ended (a) democratic peace - spread of democratic values to more countries around the world - democratic states seldom go to war with each other - but there is still a 'zone of conflict' where nation states prepare themselves for war because of possible serious tensions with their neighbors, thus prompting Buzan and Little (1999, p. 104) to conclude that 'Westphalian realism is still relevant' although its 'traditional claim to serve as the commanding heights of how international relations can and should be understood is rightly under serious challenge'. (b) globalization - greater integration among nation states was facilitated by information technology and lowered tariff rates - Scholte (1997, p. 21) argues that globalization undermines governments' exercise of total and exclusive authority. In Scholte's words, '….with globalization, social relations acquire a host of non-territorial qualities, and borders are dissolved in a deluge of electronic and other flows, crucial pre-conditions for effective sovereignty are removed'. - Instead, Scholte (1997) argues that substate global governance, suprastate global governance (UN, OECD, etc.), global social movements (NGOs etc) and marketised global governance (WEF, Ford Foundation etc.) play increasingly important role in the process of global governance, and reduce the sovereign power of individual nation states
Rise of terrorism (in the aftermath of	- realists see the rise of terrorism as a struggle of power - Huntington (1993) depicted the event as the 'clash of civilization' or what George Weigel would call 'the unsecularisation of the world' (quoted in

September 11, 2001 incident) (return of realism?) - postmodern international system	Huntington, 1993, p. 26) - the international order is driven by military order - obsession with exclusive sovereignty - military skills are essential in international relations (between core and periphery where the latter is represented by 'local nuisance' like Serbia and Iraq or as 'threats to world order' like Iran, Libya, North Korea and China) (Buzan and Little, 1999, p. 96)

Source: extracted from Huntington (1993), Scholte (1997), Buzan and Little (1999)

Not all unforeseen changes affecting international relations had led to clashes among nation states. For example, the outbreak of diseases like SARS in March 2003 and bird flu in December 2003 had led to greater cooperation among nations (and with international institutions). The tsunami disaster (in December 2004), which affected countries around the Indian Ocean, also moved countless individuals, companies and governments around the world as they poured out funds and other assistance to help those affected. A conference was organized in the aftermath of the disaster and attended by top politicians from almost all major countries, including representatives from international institutions like the United Nations and World Bank. Some leaders had expressed hope that the countries could come closer together in view of the disaster, and possibly end the 30-year old conflict in Aceh province that had resulted in many killings. It could be said that no nation states present in the conference wanted to seek more power in the process. Rather, they had wanted to seek security, revive and possibly strengthen the role of the United Nations.[1]

One thing that has not changed though is the continued domination of Western countries (particularly the United States) in the economic, military and political fronts. Some have argued that the formation of the European Union and opening up of India and China could undermine US dominance. Some observers even announce the possibility of a new cold war between China and US.[2] Of

[1] International anarchy has been a major concern in many parts of the world over the last decade. For example, US decision to favour unilateral thinking and carry out pre-emptive strikes against Iraq in March 2003 has undermined the functions of the UN in general and the UN Security Council in particular. The latter has the primary responsibility for the maintenance of peace and stability around the world, and if need to, to implement enforcement and deterrence measures on a collective basis. The way the IMF dealt with the Asian financial crisis had also been heavily criticised most notably by Joseph Stiglitz (a Nobel Prize Winner) in his book 'Globalisation and its Discontent'. And recently, questions were raised on whether the World Trade Organisation (WTO) did or did not increased trade. Andrew Rose (2003), a Professor of Economics at the University of California Berkeley, shows econometrically that membership in the GATT and WTO (since 1995) was not associated with increase trade. The member countries did not seem to have significantly different trade patterns as compared to non-members.

[2] Recently, the US fears China's emergence as a major oil consumer, and competes with the US for

course, the fact that two Asian countries (China and Japan) are currently holding seats at the United Nations Security Council add some weights to the argument that the present century might just belong to Asia. It is precisely because of these existing (or perceived) threats that US will persist to preserve or even increase its power. Such efforts unfortunately could be viewed as arrogant by some factions around the world, which might in turn fuel rage and discontentment among them.

In 'The Clash of Civilizations', Huntington (1993) talks about the rise of religion as a dominant force determining morality. This, he argues, will weaken the nation states as a source of identity. He warns that the most religious persons are the young, college-educated, middle-class technicians, business persons and professionals, essentially the smart-lot capable of creating havocs in the international system. Religion has united them. What has emerged is a new form of terrorism. Tucker (2001, p. 3) argues that the religiously motivated terrorists appear more likely to conduct 'mass-casualty attacks because, unlike politically motivated terrorists, they are not constrained by the fear that excessive violence will offend some constituency, since they are only about a small circle of the elect'. For religious terrorists, the world is 'divided into 'us' and 'them', the saved and the damned, and the damned are to be destroyed'. An example in support of Tucker's argument is the terrible act enacted on September 11, 2001 where four planes were hijacked, two of which slammed into the World Trade Centre, one crashed into the Pentagon and the other fell into a field in Pennsylvania after passengers fought back and failed the plans of the hijackers. In total, more than 3,000 were killed in the incident.
How the great powers (particularly the US) respond to this contemporary change will be the focus of this essay. More specifically, this essay discusses how realists and liberalists respond to the rise of terrorist threats and the recent wars related to them. Realism and liberalism are the two main international relations theories used by academics to explain the behavior of nation states. Table 2 provides a summary of what constitutes as the main ideas of the two theories, as illustrated in Mearsheimer (2002). The following section discusses the main features of the realist doctrine and how it interprets the change after which the ideas of the liberalism school will be examined. The underlying argument of the essay is that, while both theories have their

oil supplies. On 20 January 2005, China and Canada signed a joint Statement on Energy Cooperation in the 21st Century which opens the way for Chinese firms to establish partnerships with Canadian energy companies. In December 2004, China and Venezuela signed new agreements allowing Chinese companies to explore for oil, set up refineries and produce natural gas in the "energy-rich South American country". This is particularly worrying for the US because Venezuelan President Hugo Chavez has on several occasions threatened to cut off oil supplies to the US "in response to what he asserts are persistent attempts by Washington to meddle in Venezuela's internal affairs" (Richardson, 2005).

respective explanations of the change in the international system, liberalism is often depicted in public pronouncements by policy markers, whereas realism portrays more realistically the actual policy decisions.

Table 2: Realism versus liberalism (a summary)

Realism	Liberalism
Realists are pessimistic	Liberalists are optimistic
Realists consider the nation states as main actors in international relations. Nation states are self-interested.	Liberalists consider the nation states as main actors in international relations. Nation states are self-interested.
Nation states seek more power to dominate and shape international politics. War is pursued to change or preserve the balance of power.	In the ideal case, liberalists want to abolish war from the face of the earth. War is justified only for lofty liberal goals that include fighting tyranny or spreading democracy.
External forces influence the behavior of nation states. The structure of international system shapes the states' foreign policies.	Liberalists emphasize internal characteristics of nation states, which vary considerable. They depend on ideologies and moral values.
Realists do not distinguish between good and bad states. What matters is relative power. Classical realist Machiavelli writes in the 'Prince and the Discourses' that no considerations are to be put on justice, cruelty and shame. Thomas Hobbes argues that men should surrender absolute power to 'civil authority' and live under common laws in the State of Nature.	Liberalists segregate good states from bad states. Good states pursue cooperative strategy and hardly start war on their own. Bad states cause conflicts with others.
Realists emphasize calculations of power. Nation states should compete with others to increase power. It is possible that nation states cooperate with one another but at root their interests are conflicting.	Calculations of power matter little in explaining the behavior of nation states. Bad states seek to gain more power at others' expense.

Source: extracted from Mearsheimer (2002)

Realism: how it views change in the international system

Realism is an influential doctrine in international relations. It views individuals and nation states as self-interested actors who carry out cost-benefit analyses on all alternatives available to them so that they can choose the alternative which yields the higher net benefit. Prominent classical realists include Hobbes, Thucydides and Machiavelli while Hans Morgenthau, George Kennan, Reinhold Niebuhr and Henry Kissinger are considered as modern realists.

Realists place strong emphasis on power and security issues. Classical realism (also known as human-nature realism) assumes that human beings have a strong 'will to power' to lead nation states. To increase power, nation states appear on an offensive side with the possibility of taking part in wars. Essentially, the leaders have absolute power to choose an alternative which they think will maximize national interest. Thus, when the Bush administration 'feared' that the US was in danger of biological and mass weapons attacks, it reacted unilaterally to attack Iraq with the purpose of protecting US's national interest. Classical realists would have predicted that the Bush administration had responded with military power because of international anarchy whereby world governing bodies like the UN were perceived as weak and incompetent to protect the interests of individuals around the world and the US citizens in particular. Worried about the balance of power has pushed the US to attack Iraq and strive for supremacy. Even then, realists are against the war in Iraq, questioning the government's decision to attack Iraq when so many other countries around the world have weapons of mass destruction. Realists Mearsheimer and Walt (2003), for example, argued that the US-Iraq war was unnecessary, as the US could have contained Saddam Hussein without going into war – even if Iraq possessed nuclear weapons. The US, for instance, was able to avoid military confrontation with the Soviet Union during the cold war. Hence, Realism is not against peace. The doctrine tries to detail how the real world functions, one where states are constantly in conflict with one another, resulting in them wanting to seek more power relative to others. War (or the use of preventive force) may be inevitable if it means to preserve or increase the power of the state for security and national interest purposes.

Yet, it is in the name of 'national security' that the US has initiated a preemptive war against Iraq. Preemption has been a central element of the Bush administration's National Security Strategies of both 2002 and 2006. US former Secretary of Defense Donald Rumsfeld argued the case for pre-emptive strike this way, 'It is difficult for all of us who have grown up in this country, and believe in the principle that unless attacked, one does not attack, to accept the notion of pre-emption. The question is in the 21st century, with biological weapons…that could kill hundreds of thousands of people, what does one do? Does one wait until (one is) attacked, or does one look at a pattern of behavior, a ….fact pattern and draw a conclusion?' (quoted in Leffler, 2003, p. 1049). Similarly, President Bush indicated in 2002 about the possibility of pre-emption when he said, 'Given the goals of rouge states and terrorists, the United States can no longer solely rely on a reactive posture as we have in the past. The inability to deter a potential attacker, the immediacy of today's threats, and the magnitude of potential harm that could be caused by our adversaries' choice of weapons, do not permit that option. We cannot let our enemies strike first'.[3] Clearly, in both statements, the fear of mass casualties and fatalities in the US provided an argument for the US to strike first rather than later (or not at all). Pre-emptive strike against Iraq was seen as necessary because of the possible possession of weapons of mass destruction by the Iraqis and their strong likelihood of using them directly or indirectly (like selling the weapons to the Al Qaeda) particularly when the UN could not prove, prior to the war, that the reverse might instead be the case.

Indeed, David Tucker (2001) argues that the possibility of new terrorist acts causing mass casualties is high because of the use of chemical, biological, radiological or nuclear (CBRN) weapons. This has possibly been started by truck bombing of the US Embassy in Nairobi in 1998 which killed 291 people with 5000 more casualties. Table 3 shows the lethality index which Tucker (2001) has constructed. It is calculated by dividing the number of casualties and fatalities in any period by the total number of incidents in the same period. The data indicates that international terrorism has become more lethal over the years with the fatalities index rising from 0.72 (1976-1980) to 0.75 (1986-1990) and 0.98 (1995-1999). Similarly, there is an upward trend for statistics on lethality and casualties combined rising from 1.84 (1976-1980) to 2.63 (1986-1990) and 10.68 (1995-1999) indicating that there is a tendency toward mass casualty attacks especially over the last five years. Thus, the new terrorism is more dangerous than before, a threat that the Bush administration clearly encountered.[4]

[3] Quoted in Albright (2003).

[4] While distinctive, the author warns that the latter results were possibly attributed to 'rare' events where large casualties were recorded; Arun Shinrikyo's sarin attack in the Tokyo subway (1995, 12 killed; 5500 casualties), the Tamil Tiger truck bombing of the Central Bank in Colombo (1996, 90 killed; 1400 casualties) and the truck bombing of the US embassy in Nairobi (1998, 291 killed; 5000 casualties). Removing them shows merely a marginal increase in the fatalities and casualties index.

Table 3: Terrorism Lethality Index

	Fatalities index	Percent change	Fatalities and casualties index	Percent change
Twelve-year increments				
1969-1980 1987-1999	0.55 0.73	 33	1.61 5.25	 226
Five-year increments				
1969-1973 1976-1980 1986-1990 1995-1999	0.24 0.72 0.75 0.98	 200 4 31	0.99 1,84 2.63 10.68	 86 43 306

Source: Tucker (2001), Table 1, p. 5 (data were obtained from 'Patterns of Global Terrorism', US State Department).

One thing to be clear is that the Bush administration was not the first to adopt the pre-emptive doctrine. Bush's claim that 'the United States can no longer solely rely on a reactive posture as we have in the past' is thus not entirely correct. As Leffler (2003, p. 1052) pointed out, 'Eisenhower's deployment of forces to Lebanon, Johnson's military intervention in the Dominican Republic and Reagan's attack on Libya, as well as Kennedy's blockage of Cuba and Nixon's bombing of Cambodia and Laos, all possessed unilateral, pre-emptive qualities'. Similarly, former Secretary of State, Madeline Albright (2003) wrote that former President Clinton had considered military strikes against nuclear facilities in North Korea in 1994 while in 1998, the former President launched cruise missiles into Afghanistan and Sudan in 'retaliation' for the terrorist bombing of two US embassies in Africa. Former Presidents of the US, Truman, Wilson and Roosevelt also had constant views that the world was unsafe, thus justifying the need to develop new weapons and having a strong inclination to go to war (Leffler, 2003). The above shows that American foreign policies have usually been guided by the realism doctrine although it is possible that the politicians sell their actions as liberalists.

Neo realists like Kenneth Waltz (1979, 1993, 2003) and John Mearsheimer (2001, 2002) provide alternative theories to explain the behavior of nation states. The theories assume that nation states do not seek power because human beings have a 'will to power' (the classical view) but instead they seek power for national security purposes. Changes in the international system like rise of anarchy force nation states to compete with others to survive. A key difference, however, exists between Waltz's 'defensive realism' and

Mearsheimer's 'offensive realism'. Waltz did not suggest acting offensively to seek incremental power (like going to war) as an appropriate decision because other nation states might join forces against the offender thus making it worse off than before had it not sought incremental power in the first place. Waltz viewed war as avoidable since wars that took place were a result of uncertainty and miscalculation.

Mearsheimer's 'offensive realism' theory', on the other hand, sees great powers as concerned mainly with figuring out how to survive in a world where there is no agency to protect them from each other. Nation states quickly realize that 'power is the key to their survival' (Mearsheimer, 2002, pp. 26-27). Unlike Waltz's version of maintaining power held by nation states, Measheimer finds that attaining the status quo is not easy because of the dynamic nature of international system which in turn presents nation states with the incentives and opportunities to seek more power at the expense of their rivals. A state's ultimate goal, according to Mearsheimer, is to be the 'hegemony in the system'[5] such that in the situation where anarchy prevails, it is an optimal alternative for the nation states to seek more power even at the expense of their rivals if doing so increases their odds of survival, a position that the US might have taken at least in the early years of the new millennium.

However, problem arises when *double standards* are adopted. Realism does not consider the power of non-material forms like values and ideologies in explaining the behavior of nation states. Instead, nation states strive to objectively preserve or increase their power for security and national interest purposes. This has not been the case in reality. For example, Iraq was being attacked for possession of weapons of mass destruction but no military actions were taken against North Korea, Iran and Pakistan. The latter countries also possessed equally damaging weapons. On North Korea, the US was willing to engage in soft power (Nye, 2002) to convince the North Asian country to abandon its nuclear ambitions. US double standards treatment on the Israel-Palestinian conflict could also be observed. While the US had backed the 'road map peace plan', the Palestinians were unhappy with the US because their former leader Yasser Arafat was shunned by Washington as one tainted by terrorism, while the US appears to show favoritism toward Israel at least during the first term of Bush administration (Monshipouri, 2002).

To summarize, realists have a pessimistic view in that nation states are constantly in competition with each other, and seek to gain more

[5] Note that it is the international system that forces nation states to seek more power as the optimal alternative to maximise security, not human beings' determination to seek power. This differentiates Mearsheimer's doctrine with that of Morgenthau's.

power relative to others. Some realists like Kenneth Waltz have argued that equality of power can lead to peace. As states compete with each other in arms race, what may take place subsequently is that other nations' security will feel threatened as increased stability and power in one state could translate to greater instability in other states. Realists term this phenomenon the security dilemma. As resources are scarce, overemphasis of military power building exercise may undermine growth in other areas like social security and provision of public goods which citizens may consider more important and relevant. But realists are not war loving, as some may have perceived. States merely aim to survive in the anarchical society. This is a defensive goal. But the means to attain the goal may compel states to think and act aggressively particularly when fear and distrust among the nations states become excessive and prominent.

Liberalism: how it deals with change in the international system

Stanley Hoffman (1995, p. 160) defines liberalism as a philosophical idea which 'tries to free individuals from tyranny by providing them with the right to consent to their political institutions….the essence of liberalism remains the protection of individual freedom, the reduction of state power, and the conviction that power is legitimate only if it is based on consent and respects basic freedom'. As opposed to the realism doctrine, liberalism does not see power preservation as an end itself but a means to provide individuals with the freedom to choose. H.W. Brand (2001) believed that the great age of liberalism in the US was the period of the cold war.

Liberalists (who are also known as utopians or idealists) are advocators of the democratic system, which in theory, grants people the freedom to choose their leaders, as adopted rapidly in the post war period in Japan, Germany, Italy and later in Asian and Eastern European countries. Elections in a democracy are freely contested, the leader is chosen by popular votes, and civil rights and civil liberties are substantially guaranteed (Russett, 2001, p. 233). Liberalists believe that there exists good states and bad states in the international system whereby 'good states pursue cooperative policies and hardly ever start wars on their own, whereas bad states cause conflicts with other states and are prone to use force to get their way' (Mearsheimer, 2002, p. 25).

Early liberalism has its roots in John Locke's (1632-1704) version of the State of Nature. Locke envisioned the State of Nature as a state of perfect and complete liberty to conduct one's life, free from disturbances from others (this was unlike Hobbes's version of a brutal state). The State of Nature is however not without moral guidance. It is bounded by the

Law of Nature which commands that men should not impose harm on another. The problem arises when one man declares war on another, and since in the State of Nature there is no civil government to defend those harmed, the conflict once begins will continue. Accordingly, it is in men's interest to abandon the State of Nature and come together to form civil government to, among other things, enforce property rights.

From the political and international relations standpoint, the spread of liberalism is associated with an attack on the spread of communism, colonization and imperialism. In post World War II, the US provided strong economic and military assistance to South Korea and Taiwan in view of their close proximity to communist countries: Russia and China. The aids provided by the US were very useful to South Korea and Taiwan in developing their local infrastructure and industry, and financed the import of machinery and raw materials during their import substitution phase of development. Today, South Korea and Taiwan are democratic societies and considered as Newly Industrializing Countries (NICs) alongside Singapore and Hong Kong in Asia and a selected few in other parts of the world.

Soviet invasion of Afghanistan in 1979 also resulted in US military presence to assist the latter and prevent the spread of communism to Afghanistan and other countries in the Middle East. Anxious to defeat the Soviet, the US supported the mujahideen (freedom fighters) by supplying them with guns, missiles and training. Osama bin Laden, like the US, had also used money to train the mujahidden to fight against the Soviets. Unfortunately, when the Soviet withdrew from Afghanistan in 1988, after losing more than 14,000 men, the US did not provide a good-enough reconstruction plans. Instead, a fertile ground was created for the Taliban to extend its presence and turn the mujahidden against the US largely because of the latter support of Israel. The Jihadian war against the West, as some have argued, is associated with the threat of globalization and capitalist ideas on the moral values of the Muslim-dominated countries.

The US defeat in the Vietnam War and the Watergate scandal had somewhat dampened the adoption of the liberalism doctrine to some extent as people had lesser trust on the government. It continued until the Reagan administration paved the way to end the cold war which subsequently opened the door to a reduction in the threats posed to Americans (Brands, 2001).[6] Accordingly, there was a revival of liberalism where the democratic

[6] However, Reagan's insurgent movements in Latin America, Central Asia and Africa (directed toward ending the Soviet power) created side effects such as the rise of rogue rebels in Angola and mujahedin in Afghanistan.

system was considered as 'good' and all other systems perceived as 'bad'.[7]
Liberalists would suggest that the war in Iraq (broke out in March 2003) was inevitable as a means to alter the Iraq regime from one that was dominated by a despot to a democratic one. There has been some progress in this regard. For instance, Iraq held its first election in 50 years on 30 January 2005 to elect 275-seat National Assembly and form a new government. As was mentioned earlier, an argument to attack Iraq first was based on the belief that the Iraqis possessed weapons of mass destruction and were liable to use them either directly or indirectly. Because of the perceived mass casualty in the US soil should the US be attacked again, the Bush administration sought to attack first, achieve a regime change in Iraq and hoped that this might trigger off a wave of change in the middle east. The US believes in the idea that countries with similar ideology are less likely to attack one another (thus the notion that 'the UK possessing 500 nuclear weapons are far less threatening than the Iraqis holding five nuclear weapons'). Using an analogy, successful transformation in the middle east would make the region look like the European Union where member countries live peacefully under the banner of free trade and freedom to choose. Russett (2001) provides evidence in support of this view, suggesting that democracies rarely engaged in any level of militarized disputes with each other. For instance, he found that pairs of democratic states have only one-eighth chance to threaten the use of force against each other and only one-tenth chance of actually doing so. It was also found that established democracies fought no wars against one another during the entire twentieth century, a reason being that 'democracies are more likely to employ democratic means of peaceful conflict resolution', and that they are 'readier to reciprocate each other's behavior, to accept third party mediation or good offices in settling disputes, and to accept binding third-party arbitration and adjudication' (ibid, p. 233).[8]

[7] Russett (2001) however warns that the liberalists' attempt to fight, beat and then make undemocratic nations democratic is 'no model for contemporary action'. He rejects military intervention against dictators. The reason as he explains is that, 'any time an outside power supplants any existing government the problem of legitimacy is paramount. *The very democratic norms to be instilled may be compromised* (p. 236, emphasis added). At the very least, he argues, intervention cannot be unilateral but approved, publicly and willingly, by an international body like the UN or the Organisation of American States. While democracy may be the best system we have, it should not be enforced on peoples who do not with to adopt it. See (Mahathir, 2004).

[8] This is unlike the realist doctrine. In 'The War Puzzle', John Vasquez (1993, pp. 156-162) reports several studies suggesting that power-seeking nation states were involved in more wars, initiate more wars and have more deaths per war than weaker states. The more powerful the states are, the more they are unable to avoid war. A reason being that as the stronger nation seeks to preserve or increase power, it becomes more involved with preparing for war and eventually wanting to win it, rather than taking actions that would have prevented the war.

However, the method used to attain the goal may be seen as 'undemocratic' by critics like Russett (2001) and Mahathir Mohamad (2004). Former Prime Minister of Malaysia, Mahathir Mohamad (2004, p. 2), remarked:

> *It does not strike the democrats as odd that democracy should be imposed by force from outside and not brought about democratically from inside. Killing men, women, children, the old and the infirm is justified, starving and depriving them of medical treatment is justified because their death would bring about democracy... The great liberal democratic leaders of the ethnic Europeans have as usual missed the objective of the ideology and consider the ideology as the objective.*

While democracy appears to be the best system we have today, understanding its limitations is essential. One of its limitations as Mahathir points out, is that in some countries, hundreds of people like to become leaders, which leads to the formation of many factions. He warns of elections resulting not in the best candidates winning as other factors can come into play like bribery, bad mouthing, religious trickery and others. As a result, weak governments are produced. The elected candidates would be 'perpetually worried' whether they would get support or not. Weak government may be overthrown by street riots and strikes. 'The result' he says 'is democratic anarchy'. The people suffer from too much democracy.[9]

Concluding remarks

This essay provides a brief explanation of the realism and liberalism theories of international relations. To oversimplify, the realists argue that the nation state's ultimate goal is to preserve or change the balance of power while liberalists strive to fight tyranny and advance democratic values. Undoubtedly, liberalism is a more popular school of thought in democratic societies than realism since the latter clashes with

[9] From the economic standpoint, the liberalism doctrine was accused of causing the Asian financial crisis, most notably by economist Joseph Stiglitz (2002). With the benefit of hindsight, most of the crisis-hit countries had perhaps liberalized too hastily. In Stiglitz's words, 'The IMF and the US Treasury believed, or at least agreed, that full capital account liberalization would help the region (East Asia) to grow even faster. The countries in East Asia had no need for additional capital, given their high savings rate, but still capital account liberalization was pushed on these countries in the late eighties and early nineties. I believe that capital account liberalization was *the single most important factor leading to the crisis* (Stiglitz, 2002, p. 99, emphasis added). Prior to the crisis, the governments in Malaysia, Indonesia, Thailand and South Korea were accepting the views from the west that financial repression would hinder investments and savings while financial liberalisation would enhance efficiency in their financial systems and bring their people out of poverty. The intentions were good. Unfortunately, they were not prepared to face the onslaught of currency speculators and dynamics of capital flows.

basic values (like a sense of optimism and moralism) followed so closely by the Americans, Europeans and many parts of the world. Academics may view the adaptation of the realist approach in international relations as synonymous to attempting a political suicide.

It might therefore seem odd that President George W Bush managed to get re-elected for another four years (2^{nd} term) despite appearing what seemed to fit the description of classical realism. For instance, Bush possessed extreme authority and appeared to have a 'will to power' to gain even more power as exemplified by his decision to attack Iraq pre-emptively despite lacking the support from the US Congress and the United Nations (thus 'violating' the US Constitution and UN Charter respectively). How and why he got re-elected might be a study worth pursuing. A possible explanation is that the public pronouncements of the Bush administration toward the Iraq war had successfully led a sufficient number of voters to believe that liberalism principles were actually being followed (a case that is not unique to Bush). As Mearsheimer (2002, p. 28) points out, 'American academics are especially good at promoting liberal thinking in the market place of ideas. Behind closed doors, however, the elites who make national security policy speak mostly the language of power, not that of principle and the United States acts in the international system according to the dictates of realist logic…. American foreign policy has usually been guided by realist logic, although the public pronouncements of its leaders might lead one to think otherwise'. An almost similar point was put forward by Secretary of State Condoleezza Rice in the 2002 Wriston Lecture, highlighting the fact that the job of categorizing a nation state's behavior as either realist or liberalist belonged exclusively to academics as it 'obscures reality'. In Rice's words:

> *There is an old argument between the so-called 'realist' school of foreign affairs and the 'idealist' school. To oversimplify, realists downplay the importance of values and the internal structures of states, emphasizing instead the balance of power as the key to stability and peace. Idealists emphasize the primacy of values, such as freedom and democracy and human rights in ensuring that just political order is obtained. As a professor, I recognize that this debate has won tenure for and sustained the careers of many generations of scholars. As a policymaker, I can tell you that these categories obscure reality. In real life, power and values are married completely. Power*

> *matters in the conduct of world affairs..... And the values of great powers matter as well* (Rice, 2002).

It is reasonable as a result to say that while the realist and liberalist perspectives have 'understood' the way international relations are changing in the twenty-first century, they serve different purposes. The former is adopted to explain *actual* political decisions while the latter explains the *behavior of governments in the form that is acceptable by a majority*. However, at least in democratic states, liberalism will continue to dominate and be pursued as the ideal doctrine at least until a more superior international relations theory comes along. In the meantime, deviations from the liberalist school of thought do emerge such as Joseph Nye's (2002) theory on soft power which emphasizes the role of multilateral institutions to embody the notion of collective security.

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Energy

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Energy use affects climate change, environment and economic development. Rising carbon dioxide (CO_2) and other greenhouse gases in the atmosphere result mostly from fossil energy combustion and contribute to increased temperature and changes in climate. The US, China, Russia and India contribute the biggest portion of these emissions. In Hoshiro Yuko and Norihisa Sakurai's study of 2004 "The world energy supply and demand projections to 2050", the amount of CO_2 emissions is predicted to increase to 1.7 times in 2050 compared to 2000 to become 38.4 billion tons, with Asian share going up from 24% to 42% in 2050 (Hoshino and Norihisa, 2004).

Growth in population and income worldwide is predicted to increase demand for heating and cooling, for appliances and equipment. However, energy use will be more efficient with industrial on site power generation and modern technologies used for consumer goods production.

Energy policies should ensure efficient use of secure lower-carbon energy and at the same time should not slow down economic and social development, in particular, in developing countries. Integral parts of energy policies are relative fuel prices, government policies regarding fuel diversification, climate change and air pollution and development of new clean energy-efficient technologies for power generation and transport.

The world primary energy demand is forecasted to decrease from 2000 to 2050, its growth in Asia will continue whereas in G7 nations it will go down due to energy conservation. In China and India, the supply will mainly depend on coal, whereas in G7 countries oil will become substituted by gas. Worldwide, the oil and coal use is projected to decrease by 4-5 points, and natural gas use will go up from 24% in 2000 to 34% in 2050 (Hoshiro and Norihisa, 2004).

Official Annual Energy Outlook 2007 with Projections to 2030 takes growth in real GDP as 2.9-3% per year (Energy Information Administration, Office of Integrated Analysis and Forecasting, 2006, p. 106).[1]. Because of the US dollar depreciation, this projection will need to be modified. The price of oil per barrel is reaching US$100 and could reach US$250 up to 2020 (although Annual Energy Outlook 2007 with Projections to

[1] See Table 18 in Energy Information Administration, Office of Integrated Analysis and Forecasting, 2006, p. 106.

2030 takes conservative 50-60 dollars per barrel) (Energy Information Administration, Office of Integrated Analysis and Forecasting, 2006, p. 106).[2]

Also, the report projects higher growth in end use sector consumption of petroleum, natural gas, and coal than from 1980 to 2005 but lower growth in electricity consumption. Increased demand in the transportation sector, including travel and freight, causes increased petroleum consumption. Natural gas consumption will probably increase in the residential, commercial, and industrial sectors. Natural gas is cleaner than other fuels, does not require on site storage, and is relatively moderately priced. Coal consumption in the commercial and industrial sectors will most probably decline somewhat.

On the whole, global energy use has doubled for the period from 1971-2005 and afterwards. Every year there was an average increase of about 2 % which is higher than the population growth rate. More energy is needed for global economic growth. According to World Energy Outlook 2007, world energy consumption will rise by 50% between 2005 and 2030 if governments continue existing policies (People & the Planet, 2008). China and India together will be responsible for 45% of energy demand and consumption increase.

Oil, gas and coal are still the most popular fuels. The use of coal grew particularly rapidly in China and India. This contributes to a significant increase of carbon dioxide emissions and pollution in these countries. In general, China and India are the emerging superpowers with regards to economies and energy markets. Their energy demands are driven mostly by the development in their heavy industry. A significant share of their energy needs should be imported. As their economies grow, Indians and Chinese use more energy for their homes, offices and cars. The imports come from Russia and Middle East. This trend leads to concern towards climate pollution and energy security. Also, energy supply infrastructure has to be reconsidered.

Emission reduction could only come from efficiency in fossil fuel use in industry, building and transport, use of other types of energy (nuclear power, renewables, etc.) and deployment of CO_2 capture and storage in power generation. Clean coal technology is very promising for China, India and the US where coal use is extensive. Regarding government policies, most probably they have to introduce financial value on CO_2 emissions alongside with the regulatory measures such as standards and support for research and development of new technologies.

[2] See Table 19 in Energy Information Administration, Office of Integrated Analysis and Forecasting, 2006, p. 106.

China will most probably overtake the US as the world's largest energy consumer by or around 2010 (having four times as many people). Most of the energy will be spent on heavy industry and transport. However, China also strives for more energy-efficient technologies. For example, by improving efficiencies of vehicles and electrical appliances, China will contribute to the improved efficiency world wide, because it is a net exporter of these products.

Also, China tries to use its own reserves such as extensive coal resources. Unfortunately, about 90% of all Chinese coal is located in inland regions, whereas the energy demand comes from the coastal areas. This places an additional burden on its transportation system and energy consumption.

Similar trends could be observed in India. Coal is India's most important fuel and its use is projected to nearly triple from 2005 to 2030, especially due to industry demand for electricity. India will continue to import coal, gas and oil. This country is foreseen to overtake Japan to become the world's third largest oil importer after the US and China by 2025. However, its importance as the net importer of refined oil products will also grow. Indians could also become interested in developing their light industry and services. Huge investments in energy infrastructure including attracting foreign funds are expected (OECD/IEA, 2007).

Tendencies in China and India will bring about change in the whole world. The obvious benefits will go to energy exporting countries of the Middle East, Russia, Venezuela and others. Also, implementation of energy saving and environment protective policies in China and India could reduce emissions worldwide. They will get incentives (including tax) to develop and deploy clean energy technologies such as second-generation biofuels and CO_2 capture and storage.

A recent trend in oil trade where more oil is foreseen to be traded as refined products will mostly benefit refineries in India and the Middle East.

Whereas fossil fuels account for about 80 % of world's energy consumption, nuclear power generation accounts only for 6 % for energy and 16% for electricity. The trend is that more and more countries are interested in the nuclear energy option. For example, Belarus declared it would build a nuclear power plant. French Areva will provide China with 2 European Pressurised Water reactors (EPRs), the first to be delivered by 2013 and the second by 2015. Areva will supply the fuel and additionally the Chinese counterpart, China Guangdong Power Corporation, will receive 35% stake at 3 of Areva's African uranium mines. The deal is worth 8 billion Euro. Energy hungry China is accelerating its nuclear development and "is one of the most energy exciting markets" (Agence France Presse, 2007a).

Based on the law adopted in early November 2007, the tender for nuclear power plant construction in Turkey is expected in February 2008, Energy Minister Hilmi Guler announced on 28 November 2007. Turkish officials plan to conclude the tender by mid-2008, so that construction could start in 2009 and the first power reactors begin operation in 2013 or 2014. *Nucleonics Week* provides details of the tender process and considers its prospects in view of Turkey's previous attempts to build a nuclear power plant.

Algeria and France on 4 December 2007 signed a nuclear cooperation accord that would allow for transfer of French nuclear technology to Algeria and the eventual construction of a nuclear reactor in Algeria, reported AP and Algiers A3C TV (RealTimeTraders.com, 2007).

Interesting in this respect is a joint international research and development project ITER (International Thermonuclear Experimental Reactor) which aims to demonstrate the scientific and technical feasibility of fusion power.

It is an experimental step between studies of plasma physics and future electricity-producing fusion power plants. Fusion is the energy source of the sun and the stars. On earth, fusion research is aimed at demonstrating that this energy source can be used to produce electricity in a safe and environmental-friendly way, with abundant fuel resources, to meet the needs of a growing world population.

ITER is based around a hydrogen plasma torus operating at over 100 million degrees Celsius, and will produce 500 MW of fusion power. This project involves the People's Republic of China, the European Union and Switzerland (represented by Euratom), India, Japan, the Republic of Korea, the Russian Federation, and the United States of America, under the auspices of the IAEA (ITER, 2007). The first plasma operation is expected in 2016. ITER is to be constructed in Europe, at Cadarache, near Aix-en-Provence, France. ITER brings together several leading-edge technologies

- large, high field, superconducting magnets
- large-scale cryogenic systems
- components withstanding high-power densities
- tritium handling and breeding systems
- advanced plasma heating systems
- advanced remote handling and robotics (ITER, 2007).

Hydropower accounts for 2 % of energy and 20 % of electricity globally. Renewable energy as well as hydropower makes up 14 % of the total energy demand. Included is traditional biomass (used for cooking and heating in the developing world). Modern biomass, geothermal, wind, solar and marine renewable sources make up only 2 % of energy consumption. The expectation is that their use will increase to 3 % by 2020 (Energy Information Administration, Office of Integrated Analysis and Forecasting, 2006).

In the US, wind power use is anticipated to grow from 0.4 % of total generation in 2005 to 0.9% in 2030. Generation from geothermal facilities will most probably remain at 0.4% as in 2005; energy generation from municipal solid waste will stay at 0.5%. Solar will be 0.1%. So, despite technology improvements, high prices for fossil fuel and public support of renewable energy generation, the share of power generated by sources alternate to coal, gas and oil will remain small compared to 2005. Hydropower will stay as the largest source of renewable energy generation up to 2030 with about 5.5-6% share of total energy generation. Non hydropower renewable generation, with biomass as the largest source, will increase from 2.3 % in 2005 to 3.6% in 2030, according to Energy Information Administration (Energy Information Administration, Office of Integrated Analysis and Forecasting, 2006).

An interesting initiative related to energy research was launched by Google on 27 November 2007. The company created a renewable energy R&D group to develop technologies enabling production of electricity from renewable energy sources that will be cheaper than electricity produced from coal. This initiative, known as RE<C, will focus initially on advanced solar thermal power, wind power technologies, enhanced geothermal systems and other potential modern technologies. RE<C is hiring engineers and energy experts to lead its research and development work, which will begin with a significant effort on solar thermal technology, and it will also investigate enhanced geothermal systems and other areas. In 2008, Google expects to spend tens of millions on research and development and related investments in renewable energy. As part of its capital planning process, the company also anticipates investing hundreds of millions of dollars in breakthrough renewable energy projects which generate positive returns (Google, 2007). In monetary terms, it means that 1 kilowatt of energy will be cheaper than 2.5 cents. Because of coal burning about 40% of electricity is produced in the world at the present. Google has some experience in at least using clean technology; its head office uses the most powerful solar system in the US with a capacity of 1.6 megawatt.

For example, Google already cooperates with eSolar and Makani Power companies. California-based company eSolar has a new technology using sun energy for direct warming of water. Water turns into steam, which in turn rotates the turbine which moves the generator. There are a number of massive mobile glasses which focus solar rays on collectors. Makani Power uses wind streams on high altitudes. Effectiveness of such wind facilities will increase 10 fold.

In conclusion, energy will continue to remain a major issue for most of the countries in the years to come. New technologies and approaches will need to be developed to meet increasing or changing demands for energy.

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The Effectiveness of Problem-based Instruction: A Comparative Study of Instructional Methods and Student Characteristics

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Abstract

Problem-based learning (PBL) is currently the most popular teaching method adopted in most educational institutes. It is also the most difficult to carry out because the teacher no longer teaches, but instead facilitates so that the students learn on their own. According to Mergendoller, Maxwell and Bellisimo (2006, p. 49), PBL was more effective with students of average or below verbal ability, students who were more interested in learning the subject and students who were the most and the least confident in their ability to solve problems.

Introduction

PBL is an instructional strategy that is the converse of the traditional instructional approaches such as lecture-discussion. PBL streamlines traditional teach-student interactions toward active, independent learning by the student. In PBL, teachers guide students with suggestions for further investigation, but do not assign predetermined learning behavior. Instead, students work out their own problem solutions through group work by clarifying a problem, asking necessary questions, examining these questions and producing a result that demonstrates their thoughts. In PBL, student learning focuses on complicated problems that may not have a single alternative. Thus, "students [need to] work in collaborative groups to identify and discover what they need to learn in order to solve a problem" (Hmelo-Silver, 2004, p. 235).

Reflections

Lustbader (1999) and Stuckey (2006) commented that different cultural and social backgrounds (e.g. gender, race, ethnicity, etc.) and life experiences (e.g. numbers of years working) of students and teachers are some contributory factors to diversity in classrooms. Stuckey (2006) also explained that

> *One of the values associated with respect of diverse talent and*

> *ways of learning is directly associated with a respect for diversity among people. Another aspect of having a diverse community is the understanding that the entire learning environment is enriched by diverse ideas, experiences, and values* (p. 149).

Many students at TMC come from foreign countries which do not use English as the first language. PBL could be used in the classrooms by grouping the students with a good mix of different nationalities and having them solve problems and trying to translate their solutions into diagrams and numbers. However, the limitation is that more often than not, there will not be an equal proportion of different nationalities to be formed in a group.

In terms of aptitude and interest in the subject, the teacher could administer some placement tests in the first lesson of the course and then based on their test results, organize the groupings with a comparatively higher achiever appointed as the leader of each group. The leader would be more willing to engage in the complex tasks required by PBL and exercise good influence on the other group members and at the same time learn more from the activities. The constraint is that the less motivated students might not want to co-operate with the leader and this will hinder the progress of PBL.

At the beginning of a course, it is difficult for the teacher to speculate each of the student's level of confidence in their own abilities to solve problems. The teacher could, through observations during the development of PBL in class, take note of the group members who take active roles in leading the problem-solving effort and those who look on to others to assign tasks and check results. In subsequent PBL sessions, the teacher can then re-group the students according to the outcome of his observations.

Lohman and Finkelstein (2000) reported that the group size most commonly used in PBL is six students, a figure vetoed by Dahlgren (2000) who recommended that PBL tutor groups should consist of between five to seven students. Lohman and Finkelstein (2000) examined the effect of group size on the problem solving skill, "self-directedness and technical knowledge" of students engaged on a dental education course (p. 304). Students were allocated to one of the three group sizes namely small (three students), medium (six students) and large (nine students). The results of the study supported the use of "medium size groups" (i.e. six students) with the authors concluding that "since no additional benefits to problem solving, self-directedness, or technical knowledge were found for small groups, it appears prudent to use medium size groups in PBL whenever possible" (Lohman and Finkelstein, 2000, p. 304).

Effective facilitators should "consider the various learning styles of students" and the personality type differences in designing PBL instructions (Stuckey, 2005, p. 137). Educational diversity within the classroom might tend to be "competitive and hostile rather than cooperative and supportive" (Stuckey, 2005, p. 137). To create a more effective learning climate, facilitators could design instructions that connect content to "students' experiences, incorporate students' values and promote collaboration" (Stuckey, 2005, p. 137).

Facilitators could encourage more of creative thinking and use less of traditional grading and performance evaluation processes.
PBL projects may be short or long. Short-term projects involve no more than a couple of hours' work in total. Long-term projects may require full time effort for up to two or three weeks. TMC students could engage in short-term projects as an enrichment curriculum in addition to content learning for their exams.

Some issues may arise during the PBL sessions:

1. The class will be chaotic if some of the students refuse to collaborate with the group members as not all of the students will be willing to take part in the activities.
2. The teacher will have a difficult time handling the queries of different groups at the same time if the class size is large.
3. The teacher is not supposed to give directed answers, but to give appropriate hints for the students to carry out their own investigations. This may be a tricky task because the teacher might not know how much prompting to give.
4. Time management is crucial, because some of the groups might complete their tasks faster than the other groups, while other groups might not be able to finish the tasks in time.
5. For students who will be taking exams at the end of their one-year course, it will be more important for them to focus on the contents and applications in the traditional learning environment.

After considering the various issues of the implementation of PBL, we could work on incorporating PBL in TMC.

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Robots: The Age of Intelligent Machines

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Introduction

This topic discusses on robots and what does robotics mean for a common man. For example, movies like Terminator (starring Arnold Schwarzenegger) and Artificial Intelligence are portrayed as good examples of robot and intelligence related with the machines (TheTech, 1995).

Nevertheless, robots that belong to today's generation not only walk and talk but can perform activities, which we can only dream of. We know that in most of the organizations, where humans cannot work, robots are employed to perform tedious or repetitive work or research and development work in a scientific laboratory to develop new chemicals. In the new generation, Robots will play a vital role in day-to-day human life.

We understand that robots have the potential to make the great changes in our economy, in the health sector, in our day-to-day living standards, etc. When a new technology emerges, we make use of it in robots. Each new idea or application will bring not only a sea of hopes and new possibilities, but also bring about new and unknown dangers and certainly some potential risks. Therefore, it is certain that robots will become a part of global human technology.

To state simply about the insight into robots, a robot contains algorithms that are developed using special language called Artificial Intelligence languages such as PROLOG, LISP, etc. and the process or working of algorithms according to the machine interpreted form is called Robotics. It requires the machine to understand the natural language and networking with other objects as well as recognize images and speech or speech synthesis.

Robotics not just evolves around Artificial Intelligence but also the robot's physical parts that are related in the usage along with the Intelligence. There are various commercial applications involving robots which are used in the manufacturing sector, chemical sector, safety and security systems, etc.

Procter (1995) defines a robot as "*a machine used to perform jobs automatically which is programmed and controlled by a computer*" (p. 1229). Robot was invented in the 20th century and originated from the Czechoslovakian word "*robotd*" or "*robotnik*", which means a slave or servant or forced labour; the term coined by writer Karel Capek's R.U.R. 'Rossum's Universal Robots' in 1921 (Novack-Jones, 1989). Robots in particular do not need to look like a human or act like one but are required to perform various tasks with ease and flexibility.

Robots are applied to develop radioactive chemicals in laboratories and are called as master or slave manipulators. Their physical parts contain mechanical parts in the form of linkages and steel cables. Arm manipulators can be moved with the help of push button, switch and also joystick.

Advanced technological robots contain sensory systems that can manipulate information and work similarly like a human brain. Robot "*brain*" takes the form of in-built Artificial Intelligence (AI). Artificial Intelligence allows a robot to get a condition as input (the input value can be a pre-defined in the algorithm or defined during its working) and process/decide with an action based on a particular condition.

There are different components that make up a Robot (Bellis, 2007) which are given as follows:

- *Effectors* are in the form of hands, feet, arms, and legs.
- *Sensors* are the parts which sense and detect natural objects, light, heat or some form of energy and converts the object in the form of sign or symbols which the machine can understand.
- *Computer* is the brain of the robot which consists of special instructions in the form of algorithms for controlling the robot.
- *Equipment* consist of mechanical fixtures and various tools.
- *Characteristics* represent those robots that are different from normal machines which usually perform functions by themselves and are sensitive to the environment in which they are used. They are also able to adapt to different environments and have the capability to rectify errors with prior performance and are task oriented with the ability to perform and accomplish a given task.

Commonly used industrial robots are usually heavy rigid devices used in manufacturing. These robots can operate in structured environment and perform different repetitive tasks under pre-programmed control. Until 1998, there were an estimated 720,000 industrial robots available (Bellis, 2007).

The robots, which are used in semi-structured environments like undersea and nuclear operations, are called as "*Tele-Operated Robots*" (Bellis, 2007). These robots perform non-repetitive tasks/activities and are said to have limited real-time control.

Application of Robots in Earth

We know that industrial robots perform very dangerous, quite difficult and invariably dull tasks. They can lift objects that are heavy and cannot be carried by human beings, paint on walls, handle hazardous chemicals and assemble parts of equipment. Unlike human beings, they do not get tired and make errors related to fatigue. There are various categories of industrial robots based on their mechanical structure, such as Cartesian/Gantry robot, cylindrical robot, spherical/Polar robot, SCARA robot, articulated robot and Parallel robot (Shelton, 2006).

Application of Robots in Space

It is a known fact that the leader in space-based robotic technology, NASA, develops robots for the exploration of planets and space-based research. For space-based robotic research, NASA categorizes into three main areas: exploration robotics, on-orbit servicing and science payload maintenance (Shelton, 2006).

There are two quintessential devices that exist and are so-called proven space robots. One of them is Remotely Operated Vehicle (ROV) and the other is Remote Manipulator System (RMS). Example of Remotely Operated Vehicle is Mars Pathfinder spacecraft. It was deployed on Mars's planet to analyze the atmosphere, geology, and climate in mars and the composition of soil and rocks in mars (Shelton, 2006).

Another one is NASA's Remote Manipulator System (RMS) which consists of a robot arm that can perform a huge amount of tasks on various space missions and also position and anchor devices for astronauts on a space mission (Shelton, 2006).

Application of Robots at Home

In today's generation, robots are being used in homes either in the form of leisure activity or as commercially driven home usage robots (Matthews, 2000).

Some of the recently introduced robots are Cye, Furby and Aibo. *Cye* robot is basically used in the process of vacuuming dust in homes. Although, consumer-based robots have created a greater impact, but leisure robots have not (Matthews, 2000).

Recently a company called Tiger released *Furby,* a little toy. This toy contains an impressive amount of artificial intelligence with the ability to talk and learn from other toys. Furbies contain sensors such as tilt sensors, and light sensors, a microphone device, and other various buttons placed strategically and also contain an Infra Red communication device (Matthews, 2000).

Furby has its own language embedded in it but it also has the ability to learn other languages. When furby learns a new language, it starts to teach other furbies within its area. A new robotics version of furby, The Gigabot, is in the market now (Matthews, 2000).

Sony came out with a new version of robot, which is much hyped, an expensive electronic dog called "*Aibo*". The dog can perform numerous tricks and can sense to avoid obstacles and even if it falls it can get over by itself. Aibo Robot is valued at about $2,500 each (Matthews, 2000).

General Applications of Robots

- Industrial robots used in Automobile and Manufacturing sector.
- Fire Fighting Robots
- Medical Application Robots
- Military Warfare Robots
- Farming Robots
- Robots used in maintenance jobs
- Robots used in CAD/CAM designing
- Robots used in exploring Planets and Space robots
- Robots used for Marine and underwater Exploration (Matthews, 2000).

Conclusion

Robotics is one of the most emerging and interesting fields that catches the attention of not only professional programmers and software developers but also those new to the field of IT. NASA is carrying out more robotic projects like Phoenix Mars Mission and planet quest project – searching for earth-like worlds, etc. Many Research and Development companies are carrying out extensive research in the field of Robotics. It is predicted that home-based commercial robots can be purchased with a price tag of not more than the price of a vacuum cleaner, probably in the range of an expensive one (Matthews, 2000).

Nowadays, computers are getting more powerful in terms of processing power and storage. Interacting or communicating with robots using your home computer will be a reality and there is hope that there will not be maids performing household work in future but instead robots will be employed and trusted with equipment albeit in the hands of human beings playing with them.

The day is not far when Robots play an important role in replacing human beings completely!

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