CHAPTER I

INTRODUCTION

The growth and development of one nation depends upon the size and quality of its population. Overpopulation in any country will definitely have adverse effect on individual, social, economic and national development (Michael, 2010). The consequences of population growth, for the social and natural environment and vice versa are of such significance that, the new generations of the young people need to become aware of them. Population explosion will affect the employment, nutritional status, health status, and in turn have an adverse effect on quality of life (Lidson, 2012). The widespread food insecurity, unhealthy living conditions, and absolute poverty in many developing countries are already threatening global stability.

By the time this day is over, about 40,000 human beings-mostly children- will have died from hunger, malnutrition and related causes (Chapman, 2010). Few of these people will have been caught up in famine or other emergencies. Most will have suffered from a “silent” assault-the kind that seldom makes the headlines, but which claims its victims just as relentlessly.

Taylor (2010) has reported that poverty is widespread in developing countries, with over 1.1 billion people living on a dollar a day or less per person. Hunger is already a constant threat to over 800 million people, while the world’s ability to continue meeting growing demand for food and other agricultural products over the long term is uncertain. Human resource development in developing countries is lagging; one billion people lack access to health services, 1.3 billion do not have access to adequate sanitation systems, and one-third of primary school enrols drop out by Grade IV. Hence either to increase quality of life or to retain the quality of life achieved, the growth of population must be controlled.
1.1 Background Problem of the Study

Every second, on an average, four or five children are born somewhere on earth. In that same second, two other people die. This means we are growing at a little less than 9000 per hour, 2, 10,000 per day, or about 77 million more people per year (Philip, 2010). The table 1.1 gives the United Nations Population Division’s latest estimate about the growth rate of population per time unit.

Table 1.1 World Population Growths per Time Unit: 2011

<table>
<thead>
<tr>
<th>Time unit</th>
<th>Births</th>
<th>Deaths</th>
<th>Natural Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>132,697,074</td>
<td>56,260,324</td>
<td>76,436,750</td>
</tr>
<tr>
<td>Months</td>
<td>11,058,090</td>
<td>4,688,360</td>
<td>6,369,729</td>
</tr>
<tr>
<td>Day</td>
<td>363,554</td>
<td>154,138</td>
<td>209,416</td>
</tr>
<tr>
<td>Hour</td>
<td>15,148</td>
<td>6,422</td>
<td>8,726</td>
</tr>
<tr>
<td>Minute</td>
<td>252</td>
<td>107</td>
<td>145</td>
</tr>
<tr>
<td>Second</td>
<td>4.2</td>
<td>1.8</td>
<td></td>
</tr>
</tbody>
</table>

Source: http://www.census.gov/cgi-bin/ipc/pcwe

The carrying capacity of earth is around 1.8 billion people, one-third the world’s current numbers. But is a continuing increase in humans good for the planet in the long run? Many people worry that overpopulation will cause – or perhaps already is causing – resource depletion and environmental degradation that threaten the ecological life – support systems on which we all depend.
1.1.1 World: Under the Threat of Population Bomb

Along with the devastating threat of atomic explosion, ‘Population explosion’ is equally harmful to our existence. If our civilization is at stake due to atomic power, it is more at stake because of huge growth rate of population (Rihels et al.; 2004). The world population means the total number of human beings alive on the planet earth at a given time. In 1901, the world population was 1.6 billion. By 1960, it became 3 billion and by 1987, five billion and in 1999 six billion. Between 1990 and 1995, it grew at 1.48 percent per annum, with an average of 81 million persons added each year (Sadhik; 1998, Joshi; 1998). In 2006, world population reached 6.5 billion. In November 2011 the world population reached 7 billion i.e.700 crore (Zeon T. and Matt; 2012). The table below shows past world population data back to the year one and future world population projections through the year 2050.

Table 1.2 World Population Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Size of Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>200 Million</td>
</tr>
<tr>
<td>1000</td>
<td>275 Million</td>
</tr>
<tr>
<td>1500</td>
<td>450 Million</td>
</tr>
<tr>
<td>1650</td>
<td>500 Million</td>
</tr>
<tr>
<td>1804</td>
<td>1 billion</td>
</tr>
<tr>
<td>1900</td>
<td>1.6 Billion</td>
</tr>
<tr>
<td>1927</td>
<td>2 Billion</td>
</tr>
<tr>
<td>1960</td>
<td>3 Billion</td>
</tr>
<tr>
<td>1975</td>
<td>4 Billion</td>
</tr>
<tr>
<td>1987</td>
<td>5 Billion</td>
</tr>
<tr>
<td>1999</td>
<td>6 Billion</td>
</tr>
<tr>
<td>2006</td>
<td>6.5 Billion</td>
</tr>
<tr>
<td>2011</td>
<td>7 Billion</td>
</tr>
<tr>
<td>2027</td>
<td>8 Billion*</td>
</tr>
<tr>
<td>2044</td>
<td>9 Billion*</td>
</tr>
<tr>
<td>2050</td>
<td>9.2 Billion*</td>
</tr>
</tbody>
</table>

*Expected

The world population has been growing continuously. The above table shows that it took two million years for the human
population to reach one billion. The second billion came in a hundred years, the third in thirty years and the fourth in fifteen years. At the present rate, the fifth billion reached in eleven years and the sixth billion in only nine years De Jouvenel (2000). The medium projections of population division of United Nations report that the global population will grow to 9.2 billion by 2050. However, deaths are only around fifty-seven million per year, and are expected to increase to ninety million by the year 2050s, Because births outnumber deaths, the world’s population is expected to reach nine billion in 2040, or by 2050(Perry and David;2008).

The world population is unevenly distributed. The developed countries of the West have less population but lot of natural resources and compatible essential and social services. The developing nations of Asia on the other hand have huge over-expanding populations but scarce natural resources and overstrained essential and other social services which are on the brink of breakdown. Asia supports more than half of the World population and it has 75% population of world’s less developed regions (Luong et.al.; 1994). The Asian countries are the worst hit by population explosion. Six of the ten most populous countries of the world, namely, China, India, Indonesia, Bangladesh, Pakistan and Japan are in Asia. Among the Asian countries, India and China together alone have 37 per cent of the world’s population (Riley and Nuttall; 1994).

1.1.2 Demographic Profile of India

The population of India on 1 March 2011 was 1,210,569,573 (The Census Report: 2011). India added 181 million to its population since 2001. India is the home of 17.5% of world’s population with only 2.42 per cent of the world’s land area (Reid; 2011). Today India ranked second in the world after China. India is slated to surpass China as the world’s most populous nation in a few decades’ time. If this trend continues, India will beat up China by 2025 A.D., making India the most populous nation in the world. It is interesting to compare that India is two fifth in area of the United States but has two and a half times its population. The population is almost equal to the combined population of U.S., Indonesia, Brazil, Pakistan, Bangladesh and Japan (1,214.3 million).
As per the 1991 census the population was 843.93 million and it has increased to 100 million by 2000 and according to 2001 census Indian population stood at 1,027,015,247 (Sharma; 2004). India’s population has jumped to 1.21 billion, an increase of more than 181 million during 2001-11 (Ruskin; 2011).

The table 1.3 shows the size and growth of population in India. The United Nations estimate show that the population of India in mid 1988 was 818.78 million and would increase to 1,455.54 million by 2025 (Dillon; 2010).

Table 1.3 Population in India-Size and Growth Rate

<table>
<thead>
<tr>
<th>Census year</th>
<th>Population in Crores</th>
<th>Average Annual Growth Rate in %</th>
<th>Density of Population (Per Sq.Km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1901</td>
<td>23.83</td>
<td>0.30</td>
<td>77</td>
</tr>
<tr>
<td>1911</td>
<td>25.20</td>
<td>0.50</td>
<td>82</td>
</tr>
<tr>
<td>1921</td>
<td>25.12</td>
<td>0.02</td>
<td>81</td>
</tr>
<tr>
<td>1931</td>
<td>27.89</td>
<td>1.06</td>
<td>93</td>
</tr>
<tr>
<td>1941</td>
<td>31.85</td>
<td>1.34</td>
<td>103</td>
</tr>
<tr>
<td>1951</td>
<td>36.10</td>
<td>1.26</td>
<td>117</td>
</tr>
<tr>
<td>1961</td>
<td>43.91</td>
<td>1.98</td>
<td>142</td>
</tr>
<tr>
<td>1971</td>
<td>54.82</td>
<td>2.20</td>
<td>178</td>
</tr>
<tr>
<td>1981</td>
<td>68.52</td>
<td>2.25</td>
<td>216</td>
</tr>
<tr>
<td>1991</td>
<td>84.63</td>
<td>2.14</td>
<td>274</td>
</tr>
<tr>
<td>2001</td>
<td>102.00</td>
<td>2.13</td>
<td>324</td>
</tr>
<tr>
<td>2011*</td>
<td>121</td>
<td>2.05</td>
<td>382</td>
</tr>
</tbody>
</table>

Source: Environment Population and Resources - Sunil Gupta,

Chinapah and Miron (1990) have pointed that the basic needs of half of the population in India are just not being met. The population growth may be described as the basic problem of the Indian economy and a great handicap in our national progress. India is trying her best to arrest the rapid growth of population, even though it is increasing at an alarming rate by breaking all the limits laid by the planners. An increase in population leads to overpopulation and unless it is checked on time it explodes and it is estimated that, population explosion would be more dangerous and destructive than the destruction caused by bombs in the Second World War.

Farrell and Jaeger (2005) have explained that, India has made remarkable progress in the last three and half decades commendable
achievements are to its credit in agriculture, industrialization and trade etc. But still in economic status, it has rated among the lowest ten in the world. Thus it is seen that in India while population is rapidly growing, the natural resources are limited, malnutrition, illiteracy and poverty are prevalent and hunger has its toll play. In India, the growth of population is not uniform. Among the Indian states Uttar Pradesh with a population of 139.1 million is the most populous state in India (Lidson; 2011).

1.1.3 Demographic Profile of Kerala

At present, population of Kerala are 3,33,87,677 i.e.3.34crore.Kerala accounts for 1.3 per cent of India’s land area but supports 3.44 per cent of the population (Census Report:2011). Census 2001 put Kerala’s population at 31,841,374 persons who included 15,468,614 males and 16,372,760 females. It grew by a mere 4.86% by adding 15, 46,303 during the last decade. According to Althusser (2005),Kerala registered a growth rate of above 2percent during 1941-71 whereas the same was true for India between1961 and 1991. Until 1971, Kerala’s growth rate was always higher than India’s and only during 1971-81 India overtake Kerala in terms of growth rate. Over the 100 years, Kerala’s population increased five times (from 6 million in 1901 to 32 million in 2001) whereas India’s population could grow slightly more than three times (from 238 million in 1901 to 1027 million in 2001).

Among the districts of Kerala, half registered a growth rate higher than the state average. The lowest growth rate was observed in Pathanamthitta (-3.12%) whereas the highest was registered in Malappuram (13.39%). Overall, the northern districts of Kerala, follow a higher growth pattern and southern districts follow, the lower population growth rate (Varma; 1990).

Kerala has 3.44 percent of India's population; at 859 persons per km², it has three times the density as the rest of India. Kerala is one of the densest states in the country. The coastal regions of Kerala have the highest density, leaving the eastern hills and mountains comparatively sparsely populated. Kerala, with a sex-ratio of 1084 females per 1000 males, is the only state in India with a positive figure. Whereas Kerala's population more than doubled
between 1951 and 1991, adding 156 lakh (15.6 million) people to reach a total of 291 lakh (29.1 million) residents in 1991, the population stood at less than 320 lakh (32 million) by 2001 (Kumar, 2011). Kerala with rapid population growth face the urgent need to reduce the growth rate of population. It places particular strains on the provision of adequate health care of all members of the society, on safeguarding jobs, on agricultural production and on the distribution of adequate food supplies and to improve living standards.

1.1.4. The impact of rapid population growth on the quality of life

Mitchell et al. (2006) have observed that the question of population is not merely quantitative but also qualitative by nature, as the implications of population growth upon the quality of life and the well being of the people are vitally important. Guston (1999) has argued that the economic and social tensions arising out of the population pressures permeate every aspect of the quality of life. Crime and violence is on the increase. Ethical and moral values are getting eroded. Nothing seems to work and future looks bleak.

Rapid population growth is one of the most serious impediments to development today; it strains resources and slows the growth of our economy. Overpopulation affects all other sectors in comparable ways. Although Kerala has the highest literacy rate in India, it has suffered from economic underdevelopment and unemployment. Paul and James (2010) carried out a study reveal that four million people are waiting for jobs after registering with employment exchanges. That leaves a few million still unaccounted for. Some of them may be self-employed and some underemployed. The fact, however, is that there is a high level of unemployment among both the skilled and the unskilled. Of the 4.12 million people who were on the register of jobseekers in June last year, 139,000 were people with professional or technical qualifications. They included 2,297 medical graduates, 7,706 engineering graduates, 31,066 engineering diploma holders, 97,014 ITI certificate holders, 690 agriculture graduates and 580 veterinary graduates. There were also 52,889 post-graduates and 232,949 graduates among them. Many young men and women do not get employment according to
their education therefore they involve in criminal activities and become drug peddler.

Kerala is one of the states which exports immigrant workers all around the globe. To a certain extent, the unemployment problem of Kerala was solved by foreign migration. The most preferred destination was USA (37.8%), followed by UAE (25.9%), Other Gulf countries (13.0%), Oman (11.8%), Other Countries (7.5%) and Saudi Arabia (3.8%) (Kurian; 2009). The emigration phenomenon to the foreign countries has been undergoing a rapid change in the last few years. Now a day there is a change in the immigration policies of foreign countries due to the mounting unemployment and economic recession. It is a threat for the job seekers from Kerala.

Thus, Kerala’s main problem is how to encounter overpopulation. Population stabilization is an urgent serious goal. Overpopulation is a major obstacle in developmental efforts and affects the quality of life of people. There are economic, environmental and socio-psychological aspects of this problem. Problems emanating from overpopulation have become a matter of concern for all.

1.1.5 Threats on Ecological Equilibrium

We are going on increasing our population every moment. But what else can be increased? It is not possible for us to create land, resources, minerals etc. As the population increases, the pressure also increases on everything which helps us to live. As the population multiplies the problems we face also multiply. So the question of population is not merely quantitative but also qualitative by nature, as the implications of population growth upon the quality and the well being of the people are vitally important. According to Reid (2006), man’s tremendous capacity to manipulate, modify or change the environment has enabled him to acquire and transmit culture from generation to generation. This keeps man in such an arrogant manner that man’s tempering with his environment has led to wide spread deforestation, soil erosion, pollution of air and water and extinction of certain plants and animals, disturbing ecological balance of the nature (Chaurasia; 1983).
Most people are not aware of the fact that the environmental problem in Kerala is associated with overpopulation. Our growing population, combined with unsustainable production and consumption patterns, is putting increasing stress on air, land, water, energy and other essential resources. Currently we consume resources much faster than we can regenerate. Swain (1987) has observed that the rate of population grows more rapidly than the production of the fodder crops. The rate in which the population grows is known as "geometric progression" and the agricultural productivity is dubbed as "arithmetic progression". Failure to assure sustainable food security will foster the very conditions that will further destabilize and polarize the state in the years to come with tremendous consequences for all people.

As the population grows, improving living standards without destroying the environment is a great challenge (Garreau; 1994). Water shortage, soil exhaustion, loss of forests, air and water pollution and degradation of coastlines afflict many areas. As we humans exploit nature to meet present needs, are we destroying resources needed for the future?

The loss of Kerala’s biological diversity continues, mainly from habitat destruction, over-harvesting, sub-division and fragmentation of land, pollution, soil erosion, water-logging, and loss of soil fertility. This decline in biodiversity is largely caused by human activity and represents a serious threat to our development. In many parts of Kerala there is widespread scarcity in food production, gradual destruction and increased pollution of fresh water resources. The causes include, the inadequately treated sewage and industrial waste, loss of natural water catchments areas, deforestation and other chemicals into the water. The atmosphere is under increasing pressure from greenhouse gases that threaten to change the climate and from chemicals that reduce the ozone layer. Forests are threatened by uncontrolled degradation and conversion to other uses because of increasing human pressure.

According to Jasanoff (1990), people are to be made conscious of the fact that they themselves are an indispensable part and parcel of the ecosystem and that ecological balance cannot be disturbed only because of the selfish desire to exploit the nature. Man must be able to differentiate between renewable and
exhaustible resources and must learn to live in harmony with nature and avoid pollution, no matter whether it is due to affluence or because of poverty.

The large population would not be a reason for great concern if the natural resources, employment opportunities, food, housing, health and other social services expanded at the rates commensurate with population growth. Berkhout and Hertin (2002) have observed that human beings are assets, if properly brought up; and a liability if their number is not in consonance with the resources of a country possess. Thus unplanned population bulge seriously jeopardizes the strategies for socio-economic development.

1.1.6 Population Education: A Solution for Overpopulation

About 42% of India’s population is below 16 years of age. This youth dependency is a burden. They will soon be adults. The reproductive behavior of their critical mass has been of crucial importance in controlling the rate of population growth. This group will strongly influence the demographic scene of the country in the next five or six decades. This is nearly half of the total population and therefore, what they learn and understand is of the utmost importance for the future of the nation. These young people will soon become adults and enter into marriage and parenthood and they will be reproducing even at an increasing rate, since they carry momentum of the past with them.

The school is a frequent focal point for national hopes and individuals despair. Children in any part of the world spend a considerable part of their lives in the schools and colleges. During their stay in the educational institutions the children are to be prepared for their future life as good citizens of the country. Relevant knowledge and skills that are necessary to function as a citizen are to be taught to them. Appropriate values and attitudes are to be developed at an early age. The period of schooling is an ideal age to develop awareness about population problems and its consequences. Therefore most of the educationists, planners and national leaders always consider that Population Education is one of the most effective tools to solve the problem of population explosion.
The goal of Population Education is to bring all-sided development like raising the quality of life of the individual, family and society at large. Population Education has a great role to play in helping to re-establish balance between man and environment.

Education of this type is not easy to convey. It is complex and demanding for teachers. Some new approaches to teaching and learning now being developed can contribute to the relevance and quality of the educational process itself. For example, well-reasoned decision-making, the development of a critical awareness and a strengthening of self-esteem provide the learner with an opportunity to clarify and reinforce values. When it is successful, Population Education can be a rewarding experience for pupil and teacher alike.

The younger generation, who will constitute the adult population of the world in the next few decades, needs to be fully informed and exposed to the dangers of the future. This makes it vital to provide them necessary education to form the right attitude and to make wise decisions with all sincerity of purpose. So Population Education is an educational approach to create awareness among the young who are at fertility age-group so as to take rational decisions towards problems arising out of rapid population growth.

The very nature of Population Explosion is a growing problem with long lasting ill effects. Therefore, whatever may be the method that is used to teach Population Education the emphasis is on student’s participation. Taylor and Hamal (1974) write that if Population Education is to be relevant in a student’s life there is a need for conceptual learning. According to them, “the purpose of Population Education is to mould children’s attitudes and rational behavior for later acceptance of decisions related to family life, then this is not efficiently done by merely changing the content of the existing curriculum to include Population Education. The whole learning process must be reformed”. Beeby (1996) points out that the pupils from traditional societies learn little in school regarding modern concepts; at best they learn manners, aspiration and rules. Poffenberger (1971) shows how little Population Education occurred within a traditional curriculum among Indian adolescents and the greater importance of other educational factors in the student’s environment for improving this education.
1.1.7 Population Education: An Interdisciplinary Approach

Teaching Population Education in the schools is not an easy task. Many scholars have attempted to identify the most effective teaching strategies that can help in creating knowledge, attitudes, behaviors and skills of students as well as of teachers.

Population Education provides a multi-disciplinary and interdisciplinary approach in understanding population phenomenon in its all dimensions- biological, physiological, anthropological, sociological, environmental and ecological, economic, political, moral and ethical. The task of Population Education is to help individuals to explore various possibilities and alternatives open to them in handling the situation. It is ideal for adopting innovations with regard to concepts, implementation of teaching methods, involving problem-solving techniques and a discovery approach, a wide range of instructional materials, aids and devices.

Because of technological outburst, the age old social life style has been taking a new form very fast. Overpopulation resulted in the emergence of disequilibrium in eco system; have posed a threat to the quality of life in Kerala. Therefore, social consciousness has been emerging in Kerala with regard to the positive and negative consequences of overpopulation and utilization of such information in the decision making machinery. Such consciousnesses form the ground for forecasting future success of the society.

With Population Education gaining momentum in our schools it was found necessary to develop tools that would give us objective data about awareness of population related issues. The term awareness generally connotes vigilance in observing or in drawing inferences from what one sees, hears, etc. However, it operationally implies not merely the knowledge or factual information but it covers one’s views, opinions, beliefs including a feeling of responsibility (Elliot; 2007). This is an indirect attempt to collect evidence of one’s attitudes. It is common knowledge that attitudes govern one’s actions. The exercise of collection of evidence of one’s attitudes is very important because Population
Education is concerned with rational decision making in population related issues.

There exists almost unanimity in the opinion that Population Education should become an integral part of education at all levels, but it should not be treated as an additional subject in the curriculum. The concepts are to be “plugged into” the curriculum of various subjects in the existing prescribed course at various levels of education.

1.1.8 How to Teach Population Education

“The way in which a child learns about population may be just as important as what he learns about it”. Most teachers are familiar with the teacher directed methods which are prevalent in most of the educational institutions, in comparison to the student managed methods. Recently studies are being conducted to explore into the effectiveness of non-curricular teaching methods. It is thought that since the area of Population Education is by its nature problem-oriented and value-laden, the methods of inquiry and the other student-managed methods are more appropriate.

A programme that helps a child to learn how to learn, how to investigate and act on problem, will have a greater impact on the attitudes and beliefs of children, than a teacher led approach where knowledge and data is poured into the child without the necessity for him to use his intellect. We know in the ultimate analysis the goals of Population Education are to (i) enable the learners to extend their understanding of population related problems (ii) develop appropriate thinking skills in analyzing population issues, and (iii) develop desirable population related attitudes. Therefore in the teaching of Population Education the use of various methodologies and techniques are suggested which are expected to help the students to understand all aspects of the population situation and then arrive at their own conclusions and decisions.

Teachers habitually use the same approach for practically all sorts of training objectives, in all kinds of learning situations and with all types of audience. This may be due to the traditional climate that resists change, or to the lack of leadership that would
encourage and motivate the use of new methodologies; or more importantly to the information gap that a variety of methods exist.

The desirability of a particular learning method, model or of a combination of methods is a question to be determined in relation to a number of factors. Often in several countries a combination or blend of these methods is also used.

1.1.9 Blended learning: an innovative way to teach Population Education

Blended learning is defined as a combination of face-to-face and computer assisted instructional strategies. However, blended learning does not occur by merely adding a few technology based methods to traditional classroom instruction. Successful blended learning requires a completely integrated approach. Zenger and Uehlein (2001) explain, “It’s only when the pieces fit together logically….. That you create a real blended solution”. The blend of methods will also vary depending on specific course needs.

Today’s students are increasingly more diverse than ever before. Recently, scholars have turned their attention to a phenomenon named the new or next generation learner (Dziuban, et.al.2004, Oblinger, 2003) using sociological, cultural, economic and political perspective rather than individual preference or psychological constructs one might incorporate when studying learning styles. There are a number of teaching methodologies, strategies and models of teaching which have been used to teach population education. By and in itself no particular learning method is superior to all other methods. Each one has its own strength and limitations. Traditionally, Population Education has been centered on lecturing and the memorization of important names and dates. The new teaching strategies are now addressing tremendous opportunity. Various delivery methods will be examined, along with the effects of blended learning on student motivation and on student learning outcomes.
1.1.10 Blended Learning Strategy for teaching Population Education

“Pupils are not single method learners” says e-learning expert Elliott Masie. If this is true, pupil performs better when they have a mix of modalities and methods of learning. In a study Julian and Boone (2001) found that, “the importance of a blended approach to learning is that, it ensures the widest possible impact of a learning experience and thus optimizes desired outcomes. Not long ago, there were battling ‘isms’, theories and schools of thought over the ‘one best theory’ to adhere to in training” says Zemke (2002). Today there is growing agreement that, “there is not, and probably never will be, one great theory of learning that will solve all our educational problems. With the exponential development of technology, the learning design options open to educators have expanded with a wide variety of opportunities. A blended learning environment combine face to face teaching with technology supported activities (Oliver, 2004). The challenge for educators is to find the optimal balance between both the face-to-face and online instruction (Christenson, 2003). As Ogusthorpe and Graham (2003) point out, “the important consideration is to ensure that, the blend involves the strengths of each type of learning environment and none of the weaknesses.

Accompanying these has been a shift in emphasis from teaching to teach (Lewis, 2002); from students being passive recipients of knowledge to active student engagement in the construction of knowledge (Bonwell & Eison, 1991). Thus blended learning design focus on learners and activities, not just content (Dillion & Zhu; 1997). Goldman and Torri-Steele (2002) have noted that, when using constructivism as the learning theory base for course design, the learner, rather than the teacher, becomes the focus of the learning environment. From a constructivist perspective, the focus of instructional design shift from strictly structured and an ordered knowledge transmission to a process focused on reconceptualization of knowledge acquisition to ensure active exploration by learner.
1.1.11 Learning Population Education through Blended Learning Strategy from a Constructivist Perspective

The present study adopts the theoretical perspective of constructivism. The core view of constructivist learning suggests that learners construct their own knowledge, which is strongly influenced by what they already know (Easley, 1998). Consequently, students are considered to learn population related aspects through a process of constructing, interpreting and modifying their own experiences. Social constructivism acknowledges the social dimension of learning and espouses the notion of students co-constructing and negotiating ideas through meaningful peer and teacher discussions (Soloman 1987). Learning Population Education from a social constructivist perspective involves students making meaning of the world through both personal and social processes. (Drives, Asoko, Leach, Mortimes and Scott, 1994).

Learners come to classrooms with a range of strongly held personal views regarding population related aspects and the elicitation of these ideas is central to pedagogy informed by constructivism (Driver & Scott, 1996). The process of eliciting students pre-instructional ideas not only helps teachers to identify common alternative conceptions and inform subsequent teaching episode but also offers students an opportunity for learning (Duit, Treagust and Mansfield, 1996). Students are motivated to find the correct views regarding population and meaningful discussion can take place (Taber, 1999). From a social constructivist position, when students engage in this process in a further oriented setting they receive an opportunity to articulate and clarify their own views and reflect critically on their own and others views. This process can lead to consensual meaning making and knowledge integration (Linn, 2000). Construction of knowledge makes a learner to forecast probabilistic statements about the future. One may say that, future is not certain. But constructivist portrayals of future scenarios do not lead us to total uncertainty. Since the past is gone nothing can be done regarding the dead events. Social constructivism link past and present experiences with futuristic vision and thus is more comprehensive in nature (Jackson, 2008). Since the problems of future population are of more complex nature, understanding such complexities and identifying appropriate
mean of solutions to such problems are the major concerns of social constructivism.

Epistemologically, constructivism is based on a subjectivist position (Guba and Lincoln, 1989). The metaphor of construction aptly summarizes the position that knowledge is built in the minds of learners through their own personal backgrounds experiences and aptitudes: “knowledge is constructed and adapted as a result of successive experiences and reflections”. (Tobin, 1990). From a constructivist perspective, Population Education should make one to interpret events of nature and cope with the world. Indeed, scientific knowledge about population related aspects are essential to make sense of observation, which they open to individual interpretations (Mathews, 1992). However, this body of knowledge is not separate from knower but represents socially constructed and validated knowledge based on experiences in the world. (Tobin and Tippins, 1993). The purpose of this study is to explore this emerging instructional strategy, specifically its use in teaching Secondary level Population Education. The investigator selected Computer Assisted Model and Futures Wheel Method as the base models for blending the new model.

1.1.12 Constructivist Background of Computer Assisted Instruction

Janssen and Reeves (1996) advocated that students learn with CAI under a constructivist learning framework. CAI can serve as a catalyst for facilitating constructivist environments if used in ways to promote reflection, discussion and problem-solving while teaching Population Education. “Technology is best used as a cognitive tool to learn with a surrogate teacher. Pedagogy and content matter most; technology and media are only vehicles, albeit powerful ones” (Reeves, 1998). Indeed, Spitznik et al. (1998) emphasized for construction rather than transmission of knowledge in Population Education, supporting student-designed and student-built intellectual products; the collaborative design of ‘technology artifacts’ such as dynamic models (e.g., using spreadsheets) and multimedia documents. “Computer-based interactive learning environments allow student-directed activities rather than computer driven tutoring”. They claimed that the construction of these
products can facilitate student’s explanations of scientific phenomena, testing of ideas and development of conceptual understanding. Such uses also supported Edelson’s (1998) recommendation that technology be used productively to adapt practice for the purpose of learning Population Education. He believed that technology could help students experience the work of scientists by helping them collect and share data, analyze data through the use of modeling and visualization software, gather and evaluate evidence and communicate with peers.

1.1.13 Futures Wheel Method: a Futuristic Learning Strategy in Population Education

The Futures Wheel is a structured brainstorming futuristic method developed in 1971 by Gerome C. Glenn used to organize thinking about future events, issues, trends, and strategy. It is also called as Consequence Wheels. Futures Wheel Method is not an independent method. It has no specific area of knowledge which can have its own boundaries like physical sciences, life science and social science. Its identity lies in its methodological perspectives. Futures Wheel Method incorporates the concerns of all the disciplines with regard to changes and human development. In this sense, it is not only restricted to the fields of science and technology but also extended to all the areas of knowledge including Population Education. Especially with regard to societal system futuristic enquiries include the areas which involve contributions of different disciplines.

1.2 Need and Significance of the Study

On 11\textsuperscript{th} May, 2000 India crossed the 1 billion (100 core) mark i.e. 16 percent of the world’s population on a 2.4 percent of the globe’s land area. If current trends continue, India may overtake China in 2045, to become the most populous country in the world. While global population has increased three fold during the last century, from two billion to six billion, the population of India has increased nearly five times from 238 million to one billion in the same period.
As a result of the commendable reduction in neonatal, infant and child mortality in recent years, over 42 percent of the population in India is under 16 years of age. Edlefren (1995) pointed out that, “the young people at present will constitute the major portion of the adult population of the next two crucial decades i.e. 2010-2030, and their reproductive behaviour will be of crucial importance to the efforts to control the rate of population growth”.

Wayland (1970) stressed that, “the world’s young people; who will be made aware of the magnitude of the population problem and educated to recognize that a small family is not only proper but highly desirable and easily obtainable”. Thus children and young people have been informed about the population phenomenon; the educational system of an increasing number of nations have made progress in re-orienting school curricula away from purely academic subjects and towards a new focus- the functional demand of adult life i.e. population education.

Students at this stage are well along in the period of adolescence (at the threshold of adulthood) when physical, emotional and intellectual changes are rapid. Their interests also get expanded. Students now demonstrate an increasing desire for independent families around them. Their minds are more inquisitive, questioning and doubting orthodox ways and wisdom. They look for rapid changes and quick decisions. Emotionally they are capable of extreme dedication and loyalties to individuals and causes. They like to develop insights into problems around them and are anxious for recognition as individuals and eager to find a role to play in the family, and in local affairs. These characteristics vary from student to student, at the present educational challenges and opportunities. These characteristics can be fully utilized to produce a person who is self-disciplined, active, constructively critical of mind, intelligently participating in public affairs, dedicated to the improvement of the society and anxious to learn more and more of importance to himself and to his country.

In the present system, Population Education is not a separate subject, but it is incorporated with other subjects in the curriculum because it is closely connected with biology, social studies and mathematics. A number of these are in fact included as subject matter areas in the school curricula. In the teaching of population education, the method and media of instruction in each stage will be
different. V.K.R.V. Rao the former Union Minister of Education points out that, “the syllabus, reading materials, teaching aids, etc. will obviously have to vary according to the type of students catered for and these will include three main categories, namely, primary, secondary school students and college students. Detailed work is required for preparing these materials, however, should have some co-ordination and common approach” (The Hindu 2010).

In the teaching of population education, the method and media of instruction in each stage will be different. For the effective teaching of Population Education, teacher should make use of audio-visual aids and other instructional materials. In most of the developed countries, Population Education is done with more sophisticated educational technologies and teachers use various methods that are suitable to impart knowledge through an interdisciplinary approach. Good teaching includes teaching students how to learn, how to remember, how to think and how to motivate themselves (Weinstein and Mayer, 1986). Students are expected to learn and remember considerable body of material. The process of teaching must be useful to develop various individual capabilities in students and will pave the way for meaningful and effective learning.

Building knowledge and developing abilities to meet the challenges and opportunities of the future generation has become the major responsibilities of schools. In the wake computerization the roles of schools are undergoing a sweeping change (Abbott, 1997). Computer assisted classroom can enrich the learning environment and enhance the learning process. It makes education more widely available and produce cost effect solution to the dissemination of knowledge (Vaidyan, 1989).

The Government of Kerala has taken measures to provide computers to schools to facilitate better learning. Computer has already been introduced in all schools. This makes it extremely necessary to think of ways and means by which computers can be used as an effective learning tool.

Even though curriculum planners, educational experts and teachers are quite aware of the significance of the technology based
innovative approaches, due weightage to these approaches are not given. Teaching process is increasingly recognized to form the core of the educative process. New alternative strategies need to be developed and investigated as conventional strategies have proved ineffective (Bishop, 1989). Conventional Method has been proved to be quite in effect in the realization of instructional objectives (Anitha, 1997, Bishop, 1989; Madhu Mohan, 1999; Nayar and Shankar, 1998). In Lecture Method Students are not involved actively in the learning process. Lecture Method has been criticized for its passiveness and undue emphasis to rote memorization.

The technological changes and new innovations in instructional methods are totally ignored by most of the teachers who belong to developing countries. According to Cooper (1997), “the method adopted for imparting Population Education in developing nations are outdated verbal description that is ineffective in creating proper awareness regarding the problem of population explosion”. Considering the importance of Population Education in the present technology based learning world, educational planners are trying to introduce a comparatively new approach for the teaching of population education.

As a teacher, the investigator has visited many schools to evaluate teacher trainees and found that the majority of teachers are adopting Lecture Method for teaching Population Education. This may be due to lack of practice and non-availability of suitable innovative models, literature and reference materials for using innovative approaches for the teaching and learning of Population Education. It is presumed that a study of this type will be useful in collecting necessary data regarding various aspects of innovative models which in turn will useful in the planning and preparation of suitable curriculum to make the teaching and learning process more effective and meaningful.

The present technological changes offer tremendous opportunities for experimenting new models to teach population education. Perhaps the most promising strategy currently being implemented is blended learning; which is known as a well balanced combination of traditional face-to-face and computer assisted learning methods (Barbican, 2002; Hollis, 2002; Osguthorpe & Graham, 2003; & Zenger). The literature reveals a variety of beneficial effects on student learning outcomes from
blended learning strategies (Rutherford & Lloyd, 2001; Scheidet, 2003; wellman & Flores, 2002; yang et al., 2002). Scheidet claims, “By restructuring the classroom around the active involvement of the students, he observed that they were able to build on previous knowledge, develop personal connections to conceptual material, and improve their ability to apply information to solve problems”. Again, these results are limited in their validity due to the small sample set used in the research, but remain consistent with the findings of other researchers (Berson; Hampton et al.; 2002). Students also demonstrated improvements in self-directed thinking, self-initiated activity, and analytical analysis, collaborative peer interaction, and construction of meaning (Davis; 2009).

From a pedagogical standpoint, the designers of blended learning systems should be seeking out best practices for how to combine instructional strategies in face to face and computer mediated environments that take advantage of the strengths of each environment and avoid their weaknesses (Osguthorpe & Graham, 2003; Martin, 2003). Blended learning is a promising model for supporting teacher’s professional development that combines the advantage of traditional face-to-face interaction with technology.

The potential benefits of blended learning at the secondary level Population Education instruction are significant. Research verifies that blended learning strategies in Population Education can positively impact student motivation and student learning outcomes (Pye & Sullivan, 2001; Wiffin, 2002 ;). However, many barriers restrict the overall success of the implementation of blended learning in Population Education at the secondary level instruction. Time and money constraints along with administrative pressure for achievement on standardized tests prohibit blended learning solutions form benefiting today’s youth (Barbian, 2002; Cummings, 1995; Hollis, 2002; Zenger & Uehlein, 2001). The literature reveals a need for additional empirical research using qualitative methods to further verify of the impact of blended learning strategies on Population Education instruction.

The investigator assumes that the present teaching methods of Population Education lacks futuristic vision. Population Education is perceived as both ‘index’ and ‘means’ of development. Population Education aim at preparation of child for tomorrow.
The concept of Population Education itself is a developmental process. Educational system accommodates the ‘being’ in the process of ‘becoming’. “Becoming some thing else’ is connected with futuristic visions about changing process. In other words, Population Education has an element of futurism. At the same time Population Education enables a man to be futuristic. In the words of Toffler (1974), “education springs from images of present and create images of the future. If the image of the future held by society is grossly inaccurate, its education system will betray its youth”. This view is a base for the success of our population education system. It encourages perceiving the dynamics of futurology in life. It will be worthwhile to quote Handbook of futurology in Education (1980) that “The past several decades have been difficult ones for education. The traditional classroom model and curriculum were found to be outmoded and not relevant to our rapidly changing society”. Yet, in general, our efforts to develop something better in the future have not been successful. Currently, we are faced with many problems associated with overpopulation i.e. poverty, unemployment, economic backwardness, value degradation, pervasive illiteracy, declining public confidence in education, shifting demographics that affect ecological balance, growing inequality and the emergence of various ill effects of interactive technologies, all of which are pulling and tugging at the system in unprecedented ways. How we embrace these factors today will determine the nature of society in the next century. As it is the case with other areas of education, futurology in Population Education looks for long term perspective planning in learning, identification of futuristic learning models, technology supported strategies, forecasting the future trends in population in the context of population bomb in India and preparation of appropriate tools for saving the future India through Population Education. Moreover the futurological perspective of Population Education will strengthen the society in terms of visualizing alternative structures and forms of society for preferred futures as well as identifying crisis points; and encouraging futures oriented studies at different levels of Population Education. No doubt Futures Wheel Method based on futuristic educational theory will aid Population Education to proceed towards 21st century with a lot of hopes and opportunities.
Research in blended learning strategy has been a weak link in India. It has been felt that; the research in blended learning is inadequate as well as poor. The present teaching methods are inadequate to fulfill the needs of present technology world. So, the present study proposes to investigate a blend between two models i.e., Futures Wheel Method and Computer Assisted Instruction. The Futures Wheel Method helps to analyze a trend or event and make one to forecast the future in a systematic way. Computer integrated instruction is likely to emerge as a central goal for educators. Computer Assisted Instruction highly promising to enhance the effectiveness of teaching. (Numice, 1986). The integration of computer assisted instruction in school teaching is regarded as successful when computers are used in various subjects by a large proportion of students and teachers (Meister, 1984). Through a detailed evaluation of the two methods, investigator developed another model named as Synthetic Model.

Hence, in the present study, the investigator is trying to develop a new model named Synthetic Model by blending Computer Assisted Instruction and Futures Wheel Method based on blended learning strategy for teaching Population Education at the secondary school level.

1.3 Statement of the Problem

Present study is unique of its kind not only in Indian but also in South East Asian Region which is faced with very grave population problems. The investigator assumes that the present methods of teaching Population Education lack futuristic vision. In India it will be the first study in approaches of teaching Population Education with aims of bringing about changes in the attitudes and beliefs of the future population of India. This study is supposed to break new grounds and would establish the utility of our approaches of teaching Population Education in regard to creating an effect on the behavioral patterns of the students. So the problem under study is entitled as:

DEVELOPING AN INTERDISCIPLINARY SYNTHETIC MODEL FOR THE TEACHING OF POPULATION EDUCATION AT THE SECONDARY SCHOOL LEVEL
Introduction

Definition of Key Terms:

- **Inter disciplinary**

  Field or project that combines knowledge or experts from traditionally separate subjects or academic disciplines (Good, 1945).

  Population Education is not an independent discipline. It has no specific area of knowledge which can have its own boundaries like Physics, Mathematics and Social Science. Its identity lies in its methodological perspectives. Population Education incorporates the concerns of all the disciplines with regard to changes and human development. In this sense, it is not only restricted to the fields of science and technology but also extended to all the areas of knowledge. Especially with regard to societal system, futuristic enquiries include the areas which involve contributions of different disciplines.

- **Synthetic Model**

  The word synthetic means the result or process of taking two or more separate lines of thought or other intellectual constructs and combining them into one unified conception. From a pedagogical standpoint, synthetic means blending or combining two or more instructional strategies in face to face and computer mediated environments that take advantage of the strengths of each environment and avoid their weaknesses (Osguthorpe & Graham, 2003). Blended learning is a promising model for supporting teacher’s professional development that combines the advantage of traditional face-to-face interaction with technology.

  Model is a pattern which can be used to shape a curriculum or course to select instructional materials and to guide a teacher’s action (Joyce and Weil, 2002). Models developed through Blended learning strategy are a promising model for supporting teacher’s professional development that combines the advantage of traditional face-to-face interaction with technology.

  In the present study, Synthetic Model is a new model developed based on blended learning strategy through blending
Computer Assisted Instruction Model and Futures Wheel Method for teaching Population Education among the secondary level students.

**Population Education**

According to UNESCO, “Population Education is an educational programme which provides opportunities for a study of the population situation in the family, community, nation and world, with the purpose of developing in the students rational and responsible attitudes and behavior towards that situation.”

Population Reference Bureau Washington (1971), has observed, “Population Education is an attempt to create a deep, universal, action guiding perception of the consequences of demographic change. It seeks to bring about a realization of the individual family, social and environmental effects for the explosive increase in human population, the rapid shift in the construction and distribution of people, the implication of changing age and other demographic patterns and the conceivable options that may be open no mankind to cope with the consequent problems. While it is confined exclusively to a particular group, it is focused primarily on students, who will become the principal, child bearers, within one or two decades”.

**Secondary Level**

In the ten year school programme, the schools in Kerala state which have standards VIII, IX, X are secondary schools.

**1.4 Objectives of the study**

The study mainly focused on attaining the following objectives:

1. To identify the prevailing modalities and constrains in teaching Population Education at the secondary level.

2. To find out the extent of awareness of secondary level teachers about blended learning strategies for upbringing the
synchronization of select strategies like Computer Assisted Instruction Model and Futures Wheel Method for teaching Population Education.

3. To develop an Interdisciplinary Synthetic Model by synchronizing Computer Assisted Instruction Model and Futures Wheel Method for teaching Population Education at the secondary level. (For total sample as well as sub samples based on gender, locale and type of management).

4. To determine the effect of the Interdisciplinary Synthetic Model over the Existing Method of curriculum transaction in enhancing the awareness about overpopulation among secondary level students (for total sample).

5. To explore the feasibility of the Synthetic Model for teaching Population Education at secondary level.

6. To analyze the receptivity of Synthetic Model for teaching Population Education at the secondary level.

7. To study the suitability of Synthetic Model for teaching Population Education at secondary level in terms of existing curricular factors:
   - Syllabus
   - Time Table
   - Evaluation.

8. To find out the willingness of the secondary school teachers to implement Synthetic Model for teaching Population Education at secondary level.

9. To identify practical difficulties likely to be encountered by teachers in the implementation of the synthetic model for teaching Population Education at secondary level.

10. To collect suggestions of teachers for the effective implementation of Synthetic Model for teaching Population Education at the secondary level.
1.4 Hypotheses Formulated for the Study

1. The Synthetic Model developed through Blending Computer Assisted Instruction Model and Futures Wheel Method are effective for teaching Population Education at the Secondary level.

2. The Synthetic Model is better than its component Computer Assisted Instruction Model for teaching Population Education at the Secondary level.

3. The Synthetic Model is better than its component Futures Wheel Method for teaching Population Education at the Secondary level.

4. The Synthetic Model is better than Existing Method for teaching Population Education at the Secondary level.

5. The Synthetic Model developed through Blending Computer Assisted Instruction Method and Futures Wheel Method is better than Existing Method in enhancing the awareness about overpopulation among secondary level students.

1.5 Methodology in Brief

1.5.1 Method Selected for the Study

Considering the objectives of the study and, the nature of data required for their realization, Survey cum Experimental method is selected for the present study. The following fig.1.1 explains pictorially the methodology followed in the study.
1.5.2 Experimental Design

The investigator selected **Pre-test Post-test Non-equivalent Group Design** for the present study, since the study was to develop an interdisciplinary synthetic model for teaching Population Education at the secondary level.

1.5.3 Sample Selected for the Study

The study has made use of 993 Secondary level students. The sample also consists of Educational Experts (N=20) and Secondary School teachers (N=120) from different schools in Thrissur district of Kerala, selected on the basis of ‘**Stratified Random Sampling Technique**’. In selecting the samples, care was taken to give due representation to factors like gender, locale and type of school management.
1.5.4 Tools and Techniques used for the study

1. Population Education Prevailing Practices Questionnaire for Secondary Level Teachers
2. Blended Learning Strategy Awareness Inventory for secondary level Teachers
3. Lesson Designs in Population Education based on Synthetic Model.
5. Population Awareness Test for secondary level students.
6. Judgment Schedule for Experts and Teachers to rate the comparative effectiveness of Synthetic Model and Existing Method for teaching Population Education
7. Questionnaire for teachers to analyze the receptivity of Synthetic Model for teaching Population Education Questionnaire for Teachers to rate the suitability of the Synthetic Model for teaching Population Education.
8. Questionnaire for Teachers to rate the suitability of the Synthetic Model for teaching Population Education.
9. Willingness Scale for Secondary Level Teachers to Implement the Synthetic Model for Teaching Population Education. (Prepared by Passi and Sansanwal)

1.5.5 Experimental Procedure

Before the experiment, the total sample was given a pre-test to assess their entry behaviour in Population Education. The total sample divided into four groups. The first three groups were treated as experimental groups who were taught by Computer Assisted Instruction, Futures Wheel Method and Synthetic Model respectively. The fourth group was treated as the control group who was taught through Existing Method. After completing experimental teaching, the same achievement test in Population Education was repeated to all four groups. A population awareness
test was also administered to both experimental and control groups before and after the experimental teaching. A judgment schedule was distributed among 120 teachers and 20 experts to get their opinion regarding the comparative effectiveness of developed Model with that of Existing Method in teaching Population Education at the Secondary Level. A willingness scale was also administered among the secondary level teachers to assess their willingness to implement Synthetic Model for teaching Population Education.

1.6 Statistical techniques used for the study

The investigator used Analysis of Covariance, Critical Ratio, Chi-Square Test and Percentage for interpreting the data collected through survey cum experimental method.

1.7 Scope of the Study

The present study is an endeavor to develop an Interdisciplinary Synthetic Model based on Blended Learning Strategy for teaching Population Education through various school subjects. It is hoped that the Synthetic Model would be helpful in enhancing population awareness among the secondary level students. It is hoped that the results of the present study would help teachers to reach new frontiers in Population Education practices. The Synthetic Model holds promise for future because the schools of the future will be designed not only for learning but also for solving the problems of future generations. The better standards of life it is expected that, the findings of the study; will help the curriculum designers to make needed changes while structuring content in Population Education of according to the broad principles of connectedness between the facts as it is interdisciplinary in approach. The findings of the study can be much useful for educational planners and policy makers. It would also helpful to educationists .In short, it is hoped that the results of the study and the synthetic model would be of immense help to all those who are concerned with population education.
1.8 Limitations of the Study

Despite all possible precautions taken up to arrive at valid and reliable results, certain limitations which are inevitable in a study of the present type have crept into the study. The study was limited in the following respects:

1. The study was confined to IX standard students only.

2. The study was confined to a sample of 993 ninth standard students from Thrissur district. More generalized results could have been obtained by extending the study to other districts and increasing the sample as well.

3. The study was limited only to some population concepts and issues selected from the syllabus of ninth standard textbooks.

4. The study has attempted to experiment only one combination of Blend i.e., Synthetic Model through blending Computer Assisted Instruction Method and Futures Wheel Method of teaching.

5. Exploring the possibilities of Blended Learning Strategy, being a new area in the teaching of Population Education in India, there is lack of literature available. If more literature were available it would have been possible to give a more sound theoretical background for the study.

1.9 Organization of the Report

The report has been organized in the following order.

CHAPTER I deals with the need and significance of the study, statement of the problem, definition of terms, objectives of the study, hypotheses formulated followed by scope and limitations of the study.

CHAPTER II gives the details of various related studies conducted in the area under investigation.

CHAPTER III describes the methodology of the study and gives the details regarding the sample, Tools and Techniques, Experimental Design and Procedure and Statistical techniques applied.
CHAPTER IV presents the Theoretical background and steps involved in the preparation of Synthetic Model. It also presents the model lesson designs based on the model developed.

CHAPTER V presents details of the analysis of data, interpretation of the findings and discussion of results.

CHAPTER VI presents a short resume of the study, major conclusions, educational implications of the findings and suggestions for further research.