CHAPTER II

REVIEW OF RELATED LITERATURE

- STUDIES RELATED TO BLENDED LEARNING STRATEGY
- STUDIES ON COMPUTER ASSISTED INSTRUCTION MODEL
- STUDIES RELATED TO FUTURES WHEEL METHOD
- STUDIES ON POPULATION EDUCATION
Chapter II

Review of Related Literature

The review of related literature is the crux of the study. Only the knowledge of the past will help us to equip for the present. In this sense, review of related literature allows the researcher to acquaint herself with current knowledge in the area in which she is going to conduct her research. Review of literature avoids duplication of research work that has already been done and it helps the investigator to go deep into the study. The purpose of the review of literature is to build up the context and background of research as well as to provide a basis for deep insight and clear perspective of the overall field. In the present study, the investigator scanned the relevant studies relating to the objectives of the study. This chapter presents a thumb nails account of such studies, their ambit and outcomes.

The details are conveniently classified under the following areas.

2.1. Studies Related to Blended Learning Strategy

2.2. Studies on Computer Assisted Instruction Model

2.3. Studies Related to Futures Wheel Method

2.4. Studies on Population Education

2.1. Studies on Blended Learning

The purpose of this review is to explore blended learning as an emerging strategy, specially its’ use in teaching secondary level students. The term blended learning is being used with increased frequency in academic sector.

Joyce Neff (1998), found that, teaching through blended model have profound effect on teaching, Dziuban and Moskal (2001) reported
that blended courses at the University of Central Florida replaced face-to-face class time with computer based learning so that, a three hour course occupied only one hour of actual face to face classroom time. Moreover, they reported that blended courses when compared to traditional courses had reduced student withdrawal rates as well as superior student success rates. The American Society for Training and Development identified blended learning as one of the top ten trends to emerge in the knowledge delivery system (Rooney, 2003). It is the single unrecognized trends in higher education today (young 2002). Steambi and Bouvet (2003) have developed a mixed–mode format of instruction for two foreign language courses. Technology was utilized in this case because it allowed greater flexibility and task authentication. Student feedback indicated that the course was authentic, relevant, and useful. Negative feedback was related to technical problems.

2.1.1. Effects of Blended Learning on Student Motivation

The most common benefit researches found from studies conducted on blended learning practices in secondary level instruction has been an increase in student motivation (Berson, 1996; Lipscomb, 2003; Pye & Sullivan, 2001; Wellman & Flores, 2002; Yang and Chen, 2002). Pye and Sullivan conducted a survey regarding the teacher’s experiences with the use of computer-based applications during instruction. The case study aspect of their research included five teachers who used multiple applications in their classrooms. The researchers found that “an increase in student enthusiasm for learning social studies and a positive affect on the classroom learning environment occurs when computer-based instruction is regularly used in the middle school social studies classroom”. A similar study conducted by Wellman and Flores (2002) focused on the results reported by teachers who first took part in a professional development program and then implemented online discourse tools into their instruction. Wellman and Flores found that, “Before this professional development, teachers reported that approximately15% of their students participated in classroom discourse. During the action research period, all teachers reported that nearly 100% of their students participated in the online discourse activities”. A study conducted in Taiwan observed 24 groups of 120 students who participated in a history inquiry project (Yang et al. 2002). Observations revealed a significant increase in student motivation to learn history . The
University of Central Florida’s extensive experience with blended learning at the undergraduate level has suggested that, blended courses have high success rates and lower withdrawal rates than their comparable face-to-face courses (Dziuban, Hartman, Juge, Moskal and Sorg, 2006). Scheidet (2003) conducted a study to explore student satisfaction in a blended learning atmosphere and found that the most important factor in student satisfaction and community formation is the degree of structure in a course. Students want clearly defined objectives, assignments, deadlines, and expectations for dialogue or interaction.

2.1.2 Effects of blended Learning on Student Learning Outcomes

The literature reveals a variety of beneficial effects on student learning outcomes from blended learning strategies. Garrison, Anderson, and Archer (2000) have developed a community Inquiry Framework to guide the inquiry process in the blended learning programme. The model is based on a collaborative constructivist perspective of education, the integration of personal reconstruction of experience and collaboration. This framework has been adapted to a blended environment in order to provide faculty participants with opportunities to discuss and reflect on key redesign questions, explore and experience blended learning from a student perspective, and implement and evaluate their own course redesigns. The results of the study revealed that, the role of technology shifts from the packaging and distribution of information content to being used as a tool set to enable students to communicate and collaboratively construct their own knowledge. King and Hildreth (2001) investigated the effectiveness of a freshman-level Internet-based biology course. They compared student performance and attitudes from an Internet-based biology course to that of a traditional biology course. The results revealed that, the Internet-based course was worthwhile, one-to-one contact between the instructor and students was higher in the Internet-based course, and that the Internet-based course provided multiple sources of information for students. Rutherford and Loyd (2001) note the most significant gains compared to the standard lecture instructional strategy are found at the “comprehension level of cognitive learning”.

Waddoups and Howell (2002) conducted a case study and the results show there was increased sharing and collaboration as a result
of the hybridization. Franks (2002) has reported that students in blended-learning courses outperform those in face to face and internet only courses. Willett (2002) has tried to examine the effectiveness of teaching a blended course. She found that the student response was largely positive. One of the main advantages of the hybrid format is reduced commuting time. Tuckman (2002) has undertaken a study on hybrid instructional model combining web-based and classroom components. The purpose of the study was to determine the effectiveness of a hybrid instructional model called ADAPT. Results indicated that those students who were taught study skills through the ADAPT method achieved the highest GPA’s relative to past performance, those not taught study skills at all achieved the lowest, and those taught via traditional methods fell in between.

Leh (2002) reports on an action research on hybrid courses conducted form 1999 to 2001. The goal of the research was to investigate students’ opinions toward hybrid courses and to examine the impact of using different strategies on online communities. The investigator found that students felt a greater sense of belonging in those courses that used synchronous communication, although they enjoyed the flexibility of asynchronous communication.

Schweitzer, Paechter & Weidenmann (2003) examined how groups of learners work together in blended learning and e-learning environments. Results indicated that achievement in a particular group does not depend solely on the mode of communication used in the course.

Graff (2003,) tried investigating cognitive style differences and gender differences in sense of classroom community in a blended learning environment. Results indicated that students with intuitive cognitive styles report a lower sense of community than students with an intermediate or analytic style. Hopper (2003) who investigated the characteristics of exemplary online courses found that the best courses feature abundant and timely feedback, judicious use of technology, and learning by doing. He also found that the best online courses demonstrate attributes recognized in effective classroom teaching.

MacDonald & Mc Ateer (2003) investigated generic tutoring strategies and describes factors influencing the use of media in blended learning environments. Results established that many of the principles
underlying effective strategies apply in both distance and campus-based universities. Martyn (2003) discusses how the hybrid model provide an excellent way for institutions to enter the online arena and still ensure quality courses, and illustrates how the components of good practice can be incorporated to create an effective student-centered learning environment. Meyer (2003) attempted comparison of face-to-face and online threaded discussions led to some interesting insights. Both types of learning have value and some students seem to prefer one over the other based on their learning preferences. Students were able to rate threaded discussions in varied ways though. The investigator coded online discussions using the Garrison cognitive processing categories using this coding it was possible to find evidence of higher-order thinking in the online discussions. O’Toole and Absalom (2003) tried to learn whether the provision of course materials on the Internet had a positive effect on student achievement of course outcomes. The investigator found that those students who attend lecture and read web materials performed better on the quiz than did those students who only attended lecture or only used the web. Pan, Sivo and Brophy (2003) examined the relationship of five covert factors on the use of WebCT. Result indicated that student attitude toward WebCT instruction is a significant determinant to WebCT use.

Parkinson et al. (2003) tried to understand the overall themes in qualitative feedback from students enrolled in blended distance learning and traditional courses. Students in the traditional courses expressed satisfaction in all themes: classroom climate, learning needs, learner efficacy, interactions, and appropriate format for the content. Twigg (2003) has developed a model to improve learning and reducing cost of instruction. The aim of this study is to describe the potential benefits of using technology to improve the quality of student learning and reduce the costs of instruction by redesign instruction using technology. On average, the institutions reduced costs by 40%. Additional outcomes included increased course-completion rates, improved retention, better student attitudes towards the subject matter, and increased student satisfaction with the mode of instruction.

Utts et al. (2003) has conducted a study for comparing traditional and hybrid internet based instruction in introductory statistics classes. They explored differences between a hybrid format and traditional format course in introductory statistics. Student performance in the hybrid format equalled that of the traditional
format, but students in the hybrid format were slightly less positive in their subjective evaluation of the course. Many students in the hybrid format felt the course was more work, with some feeling the workload was excessive. Martin (2003) has developed a successful blended learning model. It consists of an initial face-to-face meeting, weekly online assessments and synchronous chat, asynchronous discussions, e-mail, and a final face-to-face meeting with a proctored final examination. Boyle et al. (2003) has conducted a study on the student success rate in a blended learning programme. Results demonstrated marked improvements in pass rates. Evaluation of the student’s use of the new environment indicated a generally positive evaluation of the main elements of the blend and widespread use of the new online features. Story Delis (2003) has found the blended courses to improve interactivity, foster peer collaboration across different learning modalities, and establish a sense of community. Dowling, Godfrey and Gyles (2003) investigated the association between the learning outcomes of students and two teaching modules: traditional face-to-face and hybrid flexible delivery. Results indicated that the hybrid flexible delivery model is more positively associated with students’ final marks and improved learning outcomes.

Cameron (2003) has compared students’ performance on simulation-based courses and static graphic representational teaching of the same courses content in an online learning environment. Results indicate that interactive learning tools, such as simulation, have the potential to increase student motivation and learning in an online environment. Carroll (2003) has reports on a professor’s initiative to supplement face-to-face courses with online instruction, while maintaining accreditation and high standards. Outcomes of this program evidence equal learning outcomes to those students who have finished the program without the online components. Christenson (2003) has tried to design a blended learning course in introductory instructional design. The process included evaluating purpose of course, audiences and learning objectives. Two different pilots of the course were undertaken and statistics regarding the outcomes and comparison to the same face-to-face course are included. Personal reflection, faculty choices and recommendations for future research are included. Cottrell and Robinson (2003) examined the possibility of using blended approaches to reduce faculty time, re-focus student time and using blended learning as a way to admit more students to a given
academic program. Students reported preferring the blended learning approach and classroom time was reduced.

King (2002) explores the dynamics and experience offered for a professor and learners participating in a hybrid-modelled classroom in teacher education. The author found that hybrid online class discussion had the potential of prompting critical thinking, dynamic interactive dialogue, and substantial peer-to-peer interaction. The depth of insight found in participants’ response was higher than is often possible in a face-to-face classroom due to time constraints. Student benefited from less driving time, and technology usually did not distract from learning. The hybrid model also allowed for more creative and interactive course assignments. One key limitation of the hybrid model is that it is affected by computer worms, power failures, and other technology problems.

Garrison, and Kanuta, (2004) offers a framework which explores how integrating online learning into traditional classrooms could be transformative for universities. Blended learning represents an opportunity to support deep learning. The authors build on earlier work using community of inquiry model to support why institutions should invest in transforming learning. The paper outlines what colleges and universities need to do to move forward blended learning.

Lynch and Dembo (2004) aimed to identify learner self-regulation skills predictive of academic success in a blended education context. Analysis of results revealed that verbal ability and self-efficacy related significantly to performance and final course grades.

Ausburn (2004) has conducted a study on Course design elements most valued by adult learners in blended online education environments. Findings indicate that adults value course designs containing options, personalization, self-direction, variety, and a learning community. Results also identify differences in learning emphasis by gender, preferred learning strategies, and previous experience with technology and self-directed learning.

Riffell & Sibley (2004) examines the effect of a hybrid course format (Part online, part face-to-face) on student attendance. A traditional lecture course was compared to a hybrid introductory college science course. Results indicated that completion rates of online homework were significantly greater than attendance rates to
lectures. Also, this difference increased with higher class rank. Therefore, it is postulated that hybrid courses may increase student attendance, particularly for upperclassmen.

Rovai & Jordan (2004) examined the effect of traditional classroom, blended, and fully online course formats on sense of community. The research hypothesis was that sense of community would be strongest in the blended course due to the greater range of opportunities for student interaction with peers and professors. Results indicated that blended courses did, in fact, produce a greater sense of community than either traditional or fully online course. This finding is attributed to the fact that blended learning courses allow professors to think less about delivering instruction and instead focus on producing learning and reaching out to students.

Wingard (2004) has conducted a multi institutional study in classroom teaching changes in a web-enhanced atmosphere. The purpose of this study is to assess the impact of Web-based enhancements on teaching and learning activities taking place in traditional classrooms. The study aims to identify changes in the classroom perceived by faculty to impact teaching and learning and to explore the insights of technologically-experienced faculty. Higher levels of interaction and comfort among course participants were reported. Faculty reported increased efficiency and convenience of making updated material available on the web. Increases were also reported in continuity between classes and student participation.

Wu and Hiltz (2004) have tried to predict learning from asynchronous online discussions. The investigators used asynchronous online discussions which occurred in both face-to-face courses and online courses to evaluate whether students perceived increased learning through discussions. Results do show students perceive increased learning. Results vary but indicate that faculty could further enhance the student perceptions with further pedagogical techniques and strategies.

Cox, Carr and Hall (2004) evaluated educational effectiveness of online chats, considering the roles of course design, group dynamics and facilitation style. Results found that these three factors strongly influenced the successful use of this medium and student participation.
Dziuban, Hartman, Moskal & Sorg, & Truman (2004) discuss the three modalities of distributed learning at UCF: Web-Enhanced (E), mixed-mode (M) and fully Web-based (W). The variables impacting the development of this multifaceted ALN initiative and the ultimate transformation of the university are discussed. Findings indicate significant growth accompanied by high faculty and student satisfaction.

Dziuban, Hartman, & Moskal(2004) describes the benefits of combined face-to-face instruction and online learning, including the potential to increase learning outcomes, lowering attrition rates, and high satisfaction among the majority of faculty and students.

Dziuban, Hartman, Juge and Sorg (2005) explore different types of blended learning courses and their effect on student learning. Research is presented on some of the demographics and outcomes for blended learning. Learning effectiveness and student satisfaction is also discussed. Lastly, blended learning is presented as a transformative construct in higher education.

Vaughan and Garrison (2005) have tried to create a cognitive presence in a blended learning community. The investigators coded discussions which occurred in both face-to-face and online. The discussions were coded using a cognitive processing framework developed by them. The results recommend that faculty be trained to understand how to improve student’s cognitive processing development through online discussions to get the most from blended learning environments which include online discussions.

Dziuban, Moska Hartman (2005) discusses blended learning environments from various perspectives. The effect of generational markers on learner’s satisfaction with blended learning is explored. Generations include Matures, Baby Boomers, Generation X, and Millennials. Analysis identified learning engagement and interaction value as the two dimensions of satisfaction. Results indicated that Millennials respond least positively to their blended learning experience. This paper also includes research on the reason blended learning is successful, different course formats, and increasing interaction.

Swan (2005) has developed a constructivist model to inform learners on how constructivism can be applied to online learning
environments. The model focuses on three interacting domains of knowledge construction: conceptualization, representation and use. Review of constructivist learning theories and published research are incorporated to demonstrate how the model can be used to improve online learning environments.

Humbert and Vignare (2005) share the results of the first year of pilot to introduce blended learning to the Rochester Institute of Technology. The results are positive. Students seem to like blended learning and believe faculty is offering more instructional strategies and resources using blended learning. Students also view positively the increased and improved student to student communication. Additional information is shared on the faculty training and course completion rates.

2.1.3 Studies on Teacher’s professional development in a blended learning environment

In the last decade, a consensus has emerged that professional development is most effective when it is long term, collaborative, school based focused on students learning, and linked to curricula that teachers have to leach (Hiebert, Gallimore & Stigler, 2002). When professional development is conducted in this way, teachers are more likely to change their instructional practices, gain greater subject-matter knowledge, and improve their teaching skills (Garet, Desimone, Bisman, & Yoon, 2001). Research into how teachers might adapt and use Blended learning models are in its infancy. Blended learning is a promising model for supporting teacher’s professional development that combines the advantage of traditional face-to-face interaction with the flexibility of technology based learning.

Sinclair and Owston (2006) developed a professional development programs on blended learning to enhance middle school teachers’ subject matter knowledge and pedagogical skills. The results indicate that the programs positively affected teacher attitudes and content knowledge in the curricular areas and motivated many teachers to transform their classroom practices.

2.1.4 Barriers to the Success of Blended Learning

Although the literature points out a number of benefits from the implementation of blended learning strategies in social studies
instruction, there are also a number of barriers inhibiting the widespread success of the learning strategy. The most immediate barriers revealed by researchers are time and resource constraints (Pye & Sullivan, 2001; Wiffin, 2002; Yang et al., 2002). A blended learning system requires a significant amount of time and financial resources at the development stage (Wiffin). The justification for such impeding requirements is the necessity for an extremely well constructed and well balanced instructional system with intense up front analysis to ensure successful implementation (Barbian, 2002; Hollis, 2002; Osguthrope & Graham, 2003; Zenger & Uehlein, 2001). Zenger and Uehlein argue, “a blended solution doesn’t occur when you just bolt on some e-learning modules to an instructor-led session”. Other barriers are found with the time requirements of the learning experience as well as the administrative pressures for improved standardized test scores.

Berson notes that the “individual construction of knowledge impeded extensive coverage of content”. This finding is significant when considering Cummings’ (1995) argument that there is a great deal of pressure on instructors to spend class time on standardized test preparation. If the administration is pushing for standardized test achievement it would be difficult for any instructor to successfully implement a blended learning solution, regardless of the other benefits to learning outcomes. It is precisely for that reason why Rutherford and Lloyd (2001) argue, “a focus upon student achievement at various cognitive levels provides a more sensitive and discriminating analysis than research that compares instructional strategies solely through the measurement of overall outcomes”. Administrative pressure often then leads to a desire for instant gratification, which leads to the acquisition of technology that is them haphazardly used without any initial analysis or structural development, all but ensuring the failure of the blended system and skewed research results (Pye & Sullivan).

2.2 Studies Related to Computer Assisted Instruction

A number of researches have been conducted in finding out the effectiveness of Computer Assisted instruction in teaching learning process. Kulick et al. (1986), Kulick et al (1987) and Singh et al. (1991) made research studies to determine the effect of Computer Based instruction on student learning, attitudes and instruction time. They have been conducted across all levels of education, elementary,
secondary, post secondary and adult. The studies have similar conclusions. The use of Computer based Instruction has a positive effect on student achievement and attitudes towards computer and instruction and it substantially reduced instruction time.

Burke et al (1992), Richardson & Daniel (1992), and Chistmann et al. (1997) examined the progressive comparison of the effects of CAI on the academic achievement with students who instructed through conventional lecture method. The results indicated that there exists a significant difference in the performance between the Computer Assisted Instruction practice group and conventional lecture practice group.

2.2.1 Computer Assisted Instruction in Teaching

Nishiono (1984), Hauben et al. (1983), Jayamani (1991), and Mc Caskey et al (1989) made studies on effectiveness of computer assisted instruction in teaching of science in terms of achievement. They concluded that computer assisted instruction has a positive effect on the academic achievement of the students.

Ackerson John (1986) developed a package for Computer Assisted Instruction to find out its use in teaching social science and they concluded that the use of computers is potentially helpful in teaching social science.


Anuradha and Mahapatra (1997) developed a software package consisting of Computer Assisted Instruction, specially designed for Assignment, Discussion and Library reference for IXth standard students and found this software package to be significantly superior to the traditional approach in terms of reasoning ability in science.
Kumar (1998) made an experimental study on the relative effectiveness of 3 methods of instruction – exposition method, programmed learning method and multimedia method in science education. Multimedia method was found to be more effective than the other two methods. He also found that retention in learning by the multimedia method was higher than by the other two methods.

The investigator reviewed studies related to the use of Computer in teaching various subjects Jyothi (2007) prepared a self-Instructional module comprised power-point slides for teaching Chemistry to class IX students and found that it had immense influence. Students were better motivated and interestingly participated in Computer Based Learning.

Antonym and Arunaraja (2007) carried out an experiment study and found that CBL package was more effective in teaching Chemistry. The package also motivated students to understand concepts, theories, laws, derivations, formulas and reactions used in Chemistry.

### 2.2.2 Computer Assisted Instruction in other fields of education.

Mahajan (1992) has studied about the computer based entrance examination and found it practicable in terms of time and convenience. Conners et al. (1987), Ton & Nancy (1995), Caffora (1995), Boshabd Andera (1994), Davidson et al. (1994), Mahajan (1994), Sullivan et al (1994), Odenthal (1993), Jacoby & Sherry (1993), Sock & Recardo (1992), Gross & Beatrice (1989), and made research studies to find out the effectiveness of Computer Assisted Instruction in developing various skills problem solving, higher order thinking, creativity etc. The outcome was positive. Wilson et al.(1996), Xin (1996) and Hughes et al. (1997) conducted studies in this area and found that the Computer Assisted Instruction were responsive to the needs of the Learning Disabled/Mentally Retarded learners problem solving situation and in the attainment of several concepts in teaching-learning process. Bloock et al. (1998) have compares the cost of designing comprehensive K-12 Science Curriculum claims that the use of Computer Assisted Curriculum development reduces the cost of designing original curriculum.
Dalton et al. (1998) have compared the effect of individual and co-operative Computer Assisted Instruction on the performance and attitude towards the instruction of the 8th grade working individually on a computer-based sex education lesson with those of learners working co-operatively in dyads. Interaction on an attitude measure was detected among instruction method, gender and ability and the result indicates that co-operative learning yielded superior performance.

Balasubramaniam and Meera (2002) conducted an experiment study and found that Computer Assisted Instruction in drill and practice mode and Computer Assisted Instruction in simulation mode were more effective when compared to Computer Assisted Instruction in tutorial mode. They also found that Computer Assisted Instruction in drill and practice was more effective when compared to the Computer Assisted Instruction in simulation mode. Krishnakumar and Ambedkar (2005) conducted a study and found that Computer Assisted English Language Learning (CAELL) method to teach English grammar was more effective, particularly when used with the assistance of a teacher.

2.3. Studies on Futures Wheel Method

The field of future studies is a relatively new research area; although its epistemological origins can be linked to divination, prophecy and more recently, science fiction (Dellios, 2001). Contemporary futures research has, however, evolved from the realm of fantasy to address the pragmatic need to explore the near and far future trends in order to more fully understand the demands and decisions of the present. Futures studies have been described as more closely related to the study of growing issues than to the pure sciences. Wager (1991) argues that none of the established subject directs its full attention to the future, but the entire subject has a predictive component. Despite these sentiments, it is probably more appropriate to describe futures studies as a multidisciplinary subject that is concerned with a wide range of views about possible, probable and preferable futures. Futures wheel generally do not seek to predict the future. Futures Wheel Method is usually focusing on helping people to better understand future possibilities in order to improve decisions in the present. Educational Planners, policy makers, and managers have to make decisions in the context of uncertainty about the future. Futures Wheel Strategy very apt in taking decision about population
related issues. This method guides the younger generations to deal with future uncertainty by illuminating what is known, what can be discovered, what the range of possibilities are, what the most desirable possibilities are and how present decisions may unfold in a variety of possible futures (World Futures Society, 2007). Therefore, while not claiming to be predictive, Futures Wheel research can develop intelligent demographic forecasts about what is possible and indicate strategies that minimise risks and reduce the impact of crises. While futures research can help decision makers in connection with population issues to respond to undesirable futures, it also generates a capacity to envision desirable futures and the decisions that need to be made to reach such futures. This aspect of Futures Wheel has a strategic planning overtone and illustrates the potential application of futures research methods in helping decision makers to manage crises and risk (Hughes, 1985). This makes futures studies particularly compatible with the study of sustainability, which inherently requires a systematic, long range analysis of activities, impacts and outcomes. UNESCO (1995) observed that ‘the very notion of sustainable development requires a long-term view of development problems and policies’. This view is also consistent with recent discourse in the literature that has suggested that sustainability should not be viewed as an end point but a transition that is informed by new knowledge and understanding of complex systems (Farrell and Twining, 2004). Futures trends and developments are drawn from the work of various commentators, self-styled futurists and researchers, often outside the sphere of education. As a result, researchers often treat futures research with some suspicion. Slaughter (1996) observes that academia has traditionally valued the past much more deeply than the future and as a result have tended to discount futures research. Despite these reservations, it has been suggested that there is a clear role for universities in the development of advanced futures discourse (Lockwood and Medlik, 2001). Academic interest has been stimulated by the evolution of more rigorous methodologies within the futures studies field as well as a recognition that research, particularly with a sustainable thread, can potentially benefit from a better understanding of the future.

The futures wheel is a simple futures research method designed to systematically capture qualitative expert knowledge. The futures wheel allows researchers to identify and present secondary and tertiary consequences of trends and events. It was developed by Glenn (1972)
and has been adopted by corporate planners and public policy makers to identify potential problems and opportunities, new markets, products, and services and to assess alternative tactics and strategies. The use of the futures wheel has been documented in the futures literature as a useful tool for constructing future scenarios (Slaughter, 1987). The method, however, has been reported in only a handful of academic studies. It has been most commonly used in the education literature as a tool to help students visualise the consequences of trends or events (Wagschal and Johnson, 1986; Boujaoude, 2000; Deal, 2002). This technique has also been used to stimulate children to think about the future of their neighbourhood. A more recent research paper by Birkner and Birkner (2002) included the futures wheel in a review of methodologies for envisioning the future of occupational hygiene. In the management literature, the approach has been suggested as a group discussion technique designed to help group members think systematically about the future consequences of a decision (Haas and Martin, 1997). An exhaustive search of the tourism literature failed to reveal any studies employing the futures wheel technique. In a definitive review of the method, Glenn (1994) proposes that the futures wheel is a structured brainstorming method for organising opinions about the future. According to Glenn, the futures wheel is most commonly used to think through possible impacts of current trends or potential future events, organise thoughts about future events or trends, create forecasts within alternative scenarios. It shows complex interrelationships by developing multi-concepts futures-conscious perspective and aid in group brainstorming (Slaughter, 1996). A common approach to operationalising the futures wheel involves identifying trends or possible future events. These trends are then presented to a respondent or a group of individuals.

The Futures Wheel Method is a structured methodology to identify future risks of any issue i.e. population explosion, assess the potential impacts and plan for seemingly ever increasing risk for the development and welfare of nation—a process that will attempt to engage the “long view” of the country and its future prospects, challenges and opportunities to mitigate risks (Schwartz 1991). It is a triangulated social scientific based methodology system entitled risk reduction, a system designed to identify risks, assess their future impact on the society and in the process mitigate the most demanding of the challenges these represent. After an introduction the first phase of this methodology is coupled with a means to use the data generated
to develop a capability to envision future case scenarios that can enlighten the students on their social responsibilities and obligations.

The major task is to forecast future trends or risks and match that knowledge to the real world situation. While no one methodology will ever be free of deficiencies or limitations, the use of multiple methods to identify and define relevant future risks will increase the overall robustness of the analysis process and mitigate the inherent limitations any one method may embody. Typically in Population Education this is referred to as triangulation of methodologies (Ballard 2000), albeit ones that have been altered to fit the risk of population bomb in the country.

In Population Education the Futures Wheel Exercise begins with a forecast of future population risks and uncertainties facing the country. Forecasting is an art but one that with a little understanding can be engaged in by all levels of population explosion. It is important to know that forecasting techniques can be classified as quantitative, qualitative or mixed (Glenn and Gordon 1999). Quantitative models rest on numerical data and typically require sophisticated computer modelling to accomplish. Overall this type of technique would provide more reliable measures. They would be less stringent on validity. These methods are offered in contrast to qualitative techniques which rely more on expert judgments and hence may not satisfy those seeking more scientific explanations and high degrees of replication for verification of findings. The techniques do have a higher degree of validity, while they are generally thought lower in reliability. Those forecasting methods that mix the two – quantitative and qualitative – would offer the best of both methods – reliability and validity - and generally in methodological circles such mixed measures also represent a degree of triangulation (Ballard 2000). Forecasts can simultaneously provide normative, exploratory, or combined results (Salvadori 1997). Normative, also known as goal-oriented or teleological; forecasting is based on the assumption that future needs have an effect on the subject under study. For example growth in energy consumption in the future will change how we discuss risk in the present day. Exploratory or ontological forecasting looks at the pressures of the market as drivers for understanding the future. Combining the best qualities of these various options for forecasting the future seems easy at first blush but in fact is a more difficult task in practice. This may be best understood when one considers that
Review of Related Literature

forecasting methods are semi-complete. Some do one forecasting aspect very well and other techniques do other aspects equally as well. As previously noted, the social scientific answer to such complexity is to triangulate methods to achieve the best mix of techniques, quantitative and qualitative, perhaps even both normative and exploratory, and with recognition of what will work in forecasting the risk from overpopulation. The Future Wheel Method intended to provide the learner with some sense of the complexity one faces when trying to choose the “best” way to define the “worst case” they may face in the future. An examination and selective choices from among these forecasting options are not the only consideration. As cautioned, some of these techniques will lend themselves to oil and gas risk analysis and others will not so readily adapt to this particular social environment. The risk reduction process uses the Futures Wheel as a starting point for population related analysis. Thereafter the risk reduction process uses a combination of other methods which were selected from the plethora of ways to take the data provided in the Futures Wheel and apply it to real world applications (Fanning 2005). While the choices used in this process may overlap somewhat in orientation, they cover such dissimilar domains of knowledge that taken together they will provide a comprehensive picture of the overall risk profile – a triangulated perspective of the future that can be useful.

The aim of this study was to develop synthetic model by blending future wheel method and computer assisted instruction model for teaching Population Education at the secondary level. Our country is facing a number of problems in connection with population explosion. The use of futures wheel as one of many approaches to help education decision makers and researchers to plan for a sustainable development in future population. The potential of the futures wheel lies in its ability to help future citizens, planners and policy makers explore the outcomes of the present trends. In doing so, decision makers and researchers can use the output of a futures wheel to simulate how a decision, destination or activity might fare if certain strategies are implemented. This could help decision makers to modify plans to ensure that strategies and objectives are sufficiently robust to withstand a range of future shocks. An awareness of the possibility of future population events could support the development of more robust crisis and risk management plans.

A more complete picture of the future can be constructed by combining a futures wheel analysis with complementary qualitative
and quantitative forecasting techniques. Chong (1996) combined brainstorming rounds, a Delphi survey, futures wheels mapping, cross impact analysis and scenario writing in a futuring process. As a qualitative technique, the futures wheel is particularly useful in adding both conceptual and contextual richness to traditional quantitative methods that rely on the extrapolation of statistical data. Alternatively, the outcomes of a futures wheel can be used to identify key concepts as the basis for a more structured quantitative study. While this research utilised an ‘expert ’academic sample, the method is an easy means of diagnosing any group’s collective thinking about the future. Williams (2009) has conducted an experimental study to evaluate the effectiveness of the use of Futures Wheel Method to foster future forecasting skills of intermediate grade students. The findings of the study indicated that, there was significant difference between the scores of the treatment and control groups.

Joel, W (2010) investigated the effect of futures wheel method on learning outcomes in comparison with the lecture method. The achievement scores of students were significantly higher than the achievement scores of the students of control group after experimentation.

Bleedora, S (2007) conducted a study on the perception of the futures roles of present adolescent population revealed belonging to different lends of intelligence, creativity, extroversion-introversion, dimensions of personality and attitude towards life showed differences in the perception of future roles. Intelligent student’s perception towards life was highly optimistic. The study examined the difference in effectiveness of Futures Wheel Method and Delphi Method for enhancing future problem, solving skills of high school senior students. The results showed that there were significant differences between the mean scores of the Futures Wheel Method and Delphi Method in attaining future problem solving skills. Brown David (1981) in his study on the implementation of futures planning process model for a small college. The findings of the study revealed that, the implementation of the future planning model is effective for the working of under graduate school.

Gary (1992) conducted an analytical study of some major objectives of teaching futures studies and the ways of attaining them. The findings suggest that, while there is good deal of understanding of
what should be done, the picture of what is being done in actual practice is not very encouraging.

A good part of research in Futures Wheel Method is related to science and technological aspects. Many of the investigations deal with fringe problems and isolated aspects of scientific and technological aspects of education. The crucial issues, the teaching and learning aspects of futuristic models and the socio cultural implications of future forecasting have not been dealt with. It is high time; we switched over to more pin-pointed studies of the experimental type on really significant aspects of the problem. In the teaching of Population Education, which has been incorporated to all the school subjects in an interdisciplinary manner, the emphasis has given to only theoretical aspects. Why should we teach Population Education of the over emphasis on the theory aspects have created a confusion regarding objective and methods of the instruction.

Research in Futures Wheel Method is a weak link in India. Always, in evaluation, the subject matters related to population education is a neglected area. The future prosperity of our nation is in hands of our present young generation. To solve the problem of over population we have to create a deep awareness about population issues among the present generation.

2.4. Studies on Population Education

The studies on Population Education are being reviewed because the present study is primarily concerned to develop a new model for teaching Population Education which can contribute towards knowledge, attitudes and beliefs in the students with regards to population problems and also modify their behaviour with regards to their future success of life.

2.4.1 Studies Related to Method of Teaching Population Education

Studies on the methods of teaching Population Education are still in the infancy in Indian educational scenario. Majority of the studies associated with Population Education are concerned with knowledge and attitude level. However, in recent times research activities are carried out on pedagogical and procedural issues associated with Population Education teaching strategies. The studies reviewed below are related to the effectiveness of various methods and
approaches to teach Population Education. Lulla (1972) has developed a theoretical model suggesting the goals contents, methodology and material needed for implementing the programme at different levels – primary, secondary, collegiate and also for out of school youths.

The study conducted by Gangrade (1975), a package programme involving lectures, debates, film shows and exhibition related to population problem was found effective at the university stage. Gangrade undertook an action research also to find out the effectiveness of a package of programmes at the university level. Feneuff (1971) observed that, both the formal and informal approaches of teaching were equally effective.

Parameshwarappa (1975) has conducted an experimental study to compare the effectiveness of holistic method with the integrated method of Population Education in secondary schools. The results revealed that, the integrated method is superior to the holistic method of teaching Population Education.

Amrithagowry (1983) has conducted a study on the methods to impart Population Education among higher secondary school students. The results of the study showed that, the groups exposed to enriched methods scored better than the other groups. Kathuria(1988) found that, the peer-group discussion and mass media approaches were equally successful in developing population awareness among the students. Deshpande (1989) carried out a study on teaching Population Education to students of standard IX through their syllabus and study its effectiveness. The results showed significant differences between the pre-test and post-test scores were observed. William (1990) has concluded that, for the effects teaching of Population Education, the audio-visual materials and particularly films for classroom were needed.

Nirmala (1991) have tried to prepare teaching-learning materials in Population Education for adolescent students. The findings show that, the students increased knowledge on concepts of population related aspects through the experimental materials, and the prepared materials were found to be very effective. Christian (1992) has tried to focus on preparation and tried-out a value verification module for teaching of Population Education in the fifth standard. The
results indicate that, there was a significant difference between the mean scores of pre-test and post-test mean scores of students.

Ronny (1994) made an investigation regarding the instructional strategy suitable for the teaching of Population Education. The findings of the study show that, the traditional lecture method is not suitable for Population Education which does not make the pupil aware enough regarding the grave effects of population explosion. Regi and Sudharma (1999) have conducted a study on the effectiveness on advance organiser model and concept attainment model in teaching Population Education among the secondary level students found that both the models are effective for teaching population education among the secondary level students.

2.4.2 Studies on Awareness and Attitude of Students towards Population Education

Poffenberger (1970) has made a study on the knowledge and attitudes of Indian College students towards population related problems. He found that more than ninety per cent of students were aware of the serious population problem and also majority of the students suggested small family norm and appreciated family planning method. Patel (1974) has undertaken a study on the population awareness of pupils of standard X found that students were not conscious of consequences of family sizes on the society or nation rather they attributed family size as a personal matter.

Nagda (1975) surveyed the perception of the students of the women’s only colleges towards Population Education and found that seventy five per cent of the girls knew the meaning of population explosion. The study of prabakar (1975) showed that the Secondary School students of Bangalore city had a favorable opinion towards the introduction of Population Education irrespective of their sex, age, religion and type of school.

According to Deshmukh (1979) the general awareness of students towards population problem was found to be moderate i.e. (55 per cent). Kaur (1984) have undertaken a study on the population awareness among post-graduate students in relation to family size and family structure. It was found that postgraduate students were quite aware of population problems. Kaur (1985) have reported that majority of students in Arts and Science departments were not fully aware of
Saxena (1985) have surveyed the perception of the youth towards population problem and concluded that most of the students were aware that population problem was the major cause of India’s poverty.

Goyal (1987) has carried out a comparative study on attitude of professional and non-professional students towards population awareness and found that non-professional students had better attitudes towards population issues than the professional students. Sharma (1987) has conducted a study on the development of population awareness programme for the students of Secondary classes. The study revealed that there was no significant difference in the achievement of urban and rural students with regard to population growth and family welfare, population growth and social development, and population dynamics.

Rout (1988) undertook a study on the awareness about population and found that Science students were more aware of the population problem than the other group of students. Abraham (1991) conducted a study on school students of Hyderabad and Ranga Reddy Districts to assess their awareness, attitudes and skills on population issues. The study revealed that age had considerable influence on the performance of awareness and inters comparison of students groups. The group of (15-16) years showed better performance. A study on the awareness of the secondary school students on Population Education conducted by Pal (1992) reveals that, both boy and girl students were very much conscious and aware of the problems arising out of rapid population growth. Pany (1993) suggested that population related issues should be integrated in all school subjects instead of separate curriculum. Biswal (1999) found that population awareness is higher the female students than in the male students.

2.4.3 Studies on awareness and Attitude of Adolescents, Youths and Adults towards Population Education.

There are many studies conducted on the awareness and attitude of adolescents, youths and adults towards Population Education. Rath (1985) have undertaken comparative study of awareness about population dynamics among illiterate and neo-literate adults and found that a significant difference was seen between neo-literate and illiterate adults in respect of their awareness about population dynamics.
Ubaidullah (1985) has highlighted the variables influencing the NAEP participants’ knowledge of attitudes towards Population Education and found that age at marriage, family income, and frequency of exposure of mass media to Population Education programmes were positively and significantly related to knowledge of, attitudes towards and practices of Population Education. Sex, religion, caste, occupation, type of family and size were significantly related to knowledge of, attitudes towards and practices of Population Education.

In order to measure the attitude of doctors, engineers, teachers, clerks, students and rural people, Patnaik (1989) has conducted a study. The results of the study showed that all categories of people expressed a favorable attitude towards Population Education and its various content areas.

Kaur (1996) have made a study on population awareness among rural adults of advanced and backward villages in relation to their age, sex, educational status and family related variables. It was found that rural adult, males as well as females, of advanced villages were higher in population awareness than the rural adults of backward villages. In relation to their age, family size, caste and business, rural adults of advanced villages were more aware of population problems than their counterparts from backward villages.

2.4.4 Studies on awareness and attitude of Teachers, Parents and Administrators towards Population Education

Research studies, relating to the baseline level of knowledge and attitude prevalent among different segments of population-teachers, parents and administrators- are beginning to find interest in micro situations. The attitude of secondary school-teachers towards the population problem has attracted much greater research attention than the attitude of teachers working at the other level. Balasubramaniam et al. 1970) studied the reactions of high school teachers to Population Education as integral part of the curriculum the result reveals that, about 23% of teachers were of the opinion that Population Education would be taught as a separate subject, 49% of the teachers felt that it should be integrated with other subjects. Varghese (1970) has studied the attitude of teachers towards different aspects of population problem. The study revealed that the marital status of a teacher was not related to their attitude towards Population Education.
Poffenberger (1971) undertook a study to find out the perception and knowledge of secondary school teachers from an Indian Village about population problem. He found that, even the students of interior village’s areas are also equally aware of population problem.

Maheshwari (1972) studied the receptiveness of school teachers to Population Education. The findings of the study showed that about 70 percent of the teachers did not know the efforts being made to introduce Population Education in schools. A study was conducted by Dayal (1973) to find out teacher’s reaction to Population Education curriculum. A very few percentage except all the teachers recommended it to be introduced at the elementary level. Another study conducted by Srivastava (1973) on the knowledge, and attitude of teachers towards the introduction of Population Education in school curricula. The studies revealed that majority of the teachers were of the opinion that it should be integrated with existing school subjects especially through social sciences.

Similarly, Mehta (1974) studied the opinion of teachers as well as parents as regards to the introduction of Population Education. He found that, teachers as well as parents irrespective of their sex and educational background have a favorable opinion for its inclusion in school curriculum. Another study on the attitude of teachers towards Population Education was conducted by Nagada et al. (1974). They suggested population awareness should be created through exhibitions, film shows, and lectures by experts, group discussions and other appropriate methods. Salkar (1974) undertook a study at Goa on population awareness among school students, teachers as well as parents and their reactions to the inclusion of population in school curriculum. He found that: (i) all desired to introduce Population Education in the school curriculum, (ii) they opined that some teachers should be given specialized training so as to teach Population Education effectively.

Hanumanalu (1976) has made a survey on the knowledge and attitude of parents of out of school youth towards Population Education. The results showed that almost all the parents welcomed the idea of receiving Population Education in schools by their children.

Desai (1979) have conducted an action programme to develop curriculum in Population Education to the pupils of grades VIII & IX.
The curriculum was developed on the basis of the factors influencing everyday life and a package programme containing 12 experiments were tried out. The effectiveness of the programme was found by different methods. Thacker (1979) developed a curriculum for secondary teacher trainees and evaluated its effectiveness by implementing the programme in a training college.

Aggarwal and Gupta (1984) have in their study found that the proposed Population Education curriculum had made a significant impact on the teachers. About 90.97 percent of teachers under study had normal and above normal attitudes. The percentage of teachers falling under normal and below normal categories was 30.72 and 9.03 percent respectively. Ahluwalia and Jam (1984) have undertaken a study on the population problem. The results of the study revealed that the teachers were quite aware of population problem and the consequences of rapid population growth on the quality of life. Almost all the teachers had suggested introducing Population Education at school as well as at university level. Pushpa (1984) has studied the attitude of lectures and educational administrators about the introduction of Population Education in the schools of Punjab. The result revealed that, both the teachers and administrators positively responded for introducing Population Education in school.

Mohanty (1987) has tried to make a comparative assessment of the existing knowledge of secondary school teachers and students to ascertain their reactions to the introduction of population of education in the curriculum. The concept of Population Education was not clear to 22.3 percent of teachers and 74.2 percent of students. Some of the teachers and students opined that T.V. programmes on Population Education should be sufficiently exhibited. A study was conducted by Rao (1987) to find out the attitude of parents and teachers towards Population Education. The results revealed that, teachers and parents differed in their attitude towards Population Education and, male and female parents expressed different attitude towards Population Education. A significant difference in the attitude of rural, urban parents and teachers was also noticed.

Sahoo (1987) has conducted study on SES and educational level of teachers in relation to the size of their families and acceptance of Population Education in school curriculum, majority of the teachers opined that, introduction of Population Education is above necessity in
a developing country like India. Senapathi (1987) has conducted a study on the awareness towards population problem and attitude towards introduction of Population Education in schools. The findings of the study shows that, male teachers and teachers belonging to upper caste were in favour of Population Education while female teachers and of those of lower caste were sceptical about it. The study of Swain (1987) has on the awareness of secondary school teachers towards Population Education revealed that, there was no significant difference between male and female, with respect to their awareness of population problem and its introduction in schools.

Aktar (1988) has conducted a study entitled “A study of the knowledge and attitude of secondary school teachers in Karnataka in respect of Population Education” found out that knowledge is related with attitude towards Population Education significant differences were observed in terms of family income, exposure to mass media, contact with Population Education personnel, training and orientation programmes etc. Religion and family size were found to be the significant variables in determining attitudes. Barapanda (1988) has conducted a study on secondary school teachers to know the awareness towards population problem and attitude to introduce Population Education in secondary schools and found that both male and female teachers of younger generation and age group had a favourable attitude towards the introduction of Population Education. Pareek (1989) has conducted a study on knowledge and attitude towards Population Education among the teachers found that the general standard of knowledge about Population Education among male-female, rural-urban school teachers was good and there was no significant difference in knowledge and attitude towards population issues. In an investigation Agarwal (1990) found that, caste seemed to be a significant variable in awareness and attitude towards population problem and Population Education. Kulshrestha (1990) has made an attempt to study the attitude of women teachers towards Population Education. The findings of the study showed that younger teachers (18-28) of age group had a more positive attitude than elder teachers (40-50). Hindu women teacher’s attitude was significantly more than that of their Muslim and Christian counterparts. Reddy (1990) has conducted a study on the knowledge, attitude and practice of pre-service teachers on population issues. The results show that, religion, caste and sex did seem to influence the respondent’s attitude and awareness on population issues. Sodhi and Sigh (1990) has undertaken
as study on the attitude of rural and urban middle aged scheduled caste parents towards the population problem. They found a statistically significant difference between the attitude of rural and urban groups and also between the postgraduate rural and urban sc parents towards population problem. Verma (1990) undertook a study on the assessment of attitude of teachers and students towards Population Education in Kumaun Hills. The study revealed that, the educational level of the students had a significant effect on their attitudes towards Population Education.

Kumari (1991) has compared the attitude of the demographers, teachers and parents towards Population Education and found that demographers and teachers were favourably inclined towards Population Education. Manjulavalli (1991) conducted a study on Population Education awareness among primary school teachers. It was found that, the level of knowledge of teachers about population concepts was high and their attitude towards Population Education was highly favourable. Singh (1991) found that there was no difference in attitude between administrators and teachers; between administrators and businessman; and between teachers and businessman. Kaur (1992); Rao and Baig (1999) found no difference in the population awareness of different categories of teachers both in case of male and females. Goel and Manak (1997) reported that the female demographers were highly conscious about Population Education and had more positive attitude towards Population Education than male demographers

Out of the extensive survey and review of Population Education and related literature, it has been found that many studies have mainly concerned with the different concept and approaches in the field of Population Education. Some of the scholars defined Population Education in terms of knowledge and attitude about population, family, sex, and underlined basic values (Burleson, 1969); while others defined it as an interaction between demographic and non-demographic variables and still others considered it as an agent of attitude change (Simons, 1978). On the point of view of its approach, some studies suggested the teaching of Population Education through various school subjects (Chauls, 1974) while the others recommended the integration of this newer concept with the teacher education programme (Housen, 1960; Faneuff, 1971; Chandra, 1972; Lulla, 1974).

A large number of studies have been conducted on the teachers’ awareness and attitude towards Population Education (Varghese, 1970; Poffenberger, 1971; Maheswari, 1972; Dayal,1973; srivastava, 1973; Suchart, 1981; Aggarwal and Gupta, 1984; Ahluwalia, 1984; Kaur, 1985; Mohanty, 1987; Sahoo,1987; Swain, 1987; Akhtar, 1988; Pareek, 1989; agarwal,1990; kuleshrestha,1990; Verma,1990; Kumari, 1991; Manjulavalli,1991; Giri, 1992; Mishra, 1995; Rao and Baig, 1999). A few studies have dealt with the awareness and attitude of adults (Rath, 1985; Ubaidullah, 1985; Mohapatra, 1988; Kaur, 1996). However these studies do not have direct bearing on the present investigation. In these studies, attempts have not been made to study the method of teaching Population Education.

**Conclusion**

It is clear that a number of studies have been carried out on the knowledge, attitude and awareness about Population Education. But no effort has been made to study the various innovative learning strategies that are suitable for teaching Population Education. Hence it was felt imperative to conduct a study on the emerging strategy called blended learning strategy.

The present study is unique from the previous studies as it aims at developing a new model, “the Synthetic Model”, by blending computer assisted instruction and Futures Wheel method for teaching Population Education at the secondary level. Such kind of a study has not been reported in the literature and it is significant. The present study also lay down new norms in teaching - learning of Population Education and in developing positive attitudes and beliefs in population control.