VAG: A game of agribusiness supply chain strategy

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Abstract

VAG is a prototype animated, interactive, three-dimensional virtual environment model of a supply chain in the agribusiness sector and has been developed as a CD-based game of strategy. Users (players) have to both create their supply chain by choosing the components that make it up, and then play the game in the role of the Manager of one of the components in it: the goal being to maximise the success of that component. Evaluation of the player's business acumen and the 'health' of the particular component in the supply chain are calculated based on the information use and decision making that transpires. Animation and activated 3D graphics of decision making are trialled as a way of providing an immersive learning experience (the "Know How" rather than simply the "Know What").

VAG has been designed and developed both as a proof of concept in the use of 3D virtual reality modelling for education and research projects in rural based enterprises and their associated supply chains, and *to provide the basic infrastructure and concept for further technological, scientific and educational development with additional funding.*

Keywords

agribusiness, supply chain, virtual reality, animation, computer games, education

Introduction

The term *agribusiness* is a generic one that refers to the various businesses involved in food production. Businesses do not exist in isolation - every business has suppliers of goods it needs, and buyers of the goods it makes/sells - each having the same driving forces and critical responses. The grouping of these businesses is called a 'chain' of companies and tends to reflect the industry the businesses are involved in. The agri-industry sector is a large, multifaceted industry sector that exists worldwide, and involves a range of businesses that create industry specific (e.g. grains, sugar cane, timber, dairy, cattle/meat, fruit and vegetables, cotton, wool, to name a few) agri-industry chains that often exist across international boundaries.

Supply and value chain analysis of agri-industry chains has become a valuable tool in determining where added competitive advantage can be generated for these industries (Dunne, 2001). In addition, such analyses are important in understanding the challenges for the agri-food sector worldwide over the next 5–10 years: challenges which continue to mount and include:

- recognising that only demand driven businesses will survive
- adapting to the constant change in the market - which will be imperative
- integrating the growing environmental and social issues of a changing agribusiness sector with prevailing economic imperatives - which will become progressively more difficult
- creating innovative solutions to address the growing challenges.

The implications for agribusinesses at all levels in their respective agri-industry chains from the point of view of human resource management, knowledge creation, capacity and skills development, as well as business strategy development, are immense (Dunne, 2004).

In an attempt to facilitate this knowledge acquisition process, the project discussed in this poster set out to develop an extension of current elearning mechanisms used in tertiary level agribusiness education such as WebCT and Blackboard softwares, content-based CDs and videos (Bryceson, 2004). The goal was to create a three dimensional animated virtual reality agribusiness supply chain (called VAG) as an immersive learning environment in which players could develop and implement business scenarios, seeing the impact and effect of their decisions on the various components of that supply chain. Using components of virtual reality (Vince, 2004) and computer game play the thesis was that VAG would be an innovative approach to engaging a wide range of potential participants in agribusiness ventures, in developing the knowledge and understanding necessary to ensure the long term sustainability of the agribusiness sector.

VAG (www.nrsm.uq.edu/agribusiness)

The Virtual Reality Agribusiness World (VAG) Version 1 is a prototype of an animated, interactive, virtual reality environment that models an agri-industry sector supply chain and involves a game of strategy.

The wish: to take producers/professionals/school kids/students on a journey of discovery about agribusiness in all it's complexity and about the integration of agribusiness with environmental and social issues to promote sustainability. In addition the wish was to develop something that was immediately engaging, interesting & fun for all concerned, that delivered learning outcomes, used technology innovatively, eliminated the internal/external student learning experience differences, and which could be loosely based around the Learning Communities concept of Wenger (1998).

The VAG concept was to use virtual reality techniques to:

i.   To visualise supply and value chain issues.

ii.   To deliver innovative interactive and immersive educational experiences online via the use of 3D virtual reality gaming technologies.

iii.   To create and visualise business decision making scenarios and the related. information flows both as input into and as a result of, decision making.

iv.   To show and evaluate the impact and effects of decision making and information flows across components in an industry chain.

Design. VAG is designed around a three tier information architecture with a modular, object orientated programming approach to enable scalability onto the internet at a later date, scalability in terms of incorporating multiple supply chains, multiple players and multiple issues (physical, economic, environmental and social) to be incorporated. Customised XML schema and game application programming interfaces (API) have been used to provide ultimate generic flexibility of the design to allow non-programmers to create and use detailed physical, economic, environmental and social variable definition in order to develop new scenarios and game plays. In addition, information flows through the communication schema and 'events' of all types - (e.g. decisions, market changes, climatic events such as drought starting or stopping, hazards etc - either randomly timed or controlled) are possibilities with a general structure of target, impact and effect. The supply chain used in the prototype is the Australian cattle/beef meat industry chain. The variables that were traced throughout the prototype game are: animal age (months); weight of beast (/kg); period of growth (days); price/Unit Liveweight ($/kg).

Graphics and animations. 3D graphics were created for each component in 3D using 3D Studio Max. Isometric views only (as in SIM City) were rendered for the prototype and incorporated with Multimedia Director. Animations of decisions (eg sell beasts, provide supplementary feeding etc) were created and rendered as mpeg files for incorporation using Director and XML schema.

Scoring. Two components are tracked: *dollars in the bank* and *business acumen* (a measure of the way in which decisions are made, including what information has been used).

Help. Information or 'Help' files were created in HTML and linked to a HELP button on each scene involved in the game. Hyperlinking allows multiple information sets to be accessed easily.

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