



European Social Simulation Association

Proceedings of the
2nd International Conference
of the European Social
Simulation Association
and 2nd Model To Model
Workshop

September 16-19, 2004
Valladolid,
Spain



University of Valladolid



Junta de Castilla-León

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The first ESSA (formerly SIMSOCVI) took place in Groningen and was a top meeting in the field of social simulation. This year the conference takes place at the University of Valladolid, one of the oldest universities. The conference aims at bringing together social scientists and experts in social simulation, to explore current theoretical and applied developments in simulation of social complex systems.

Conference focus topics includes (but not limited to):

- formalising behavioural theory in agent properties,
- simulating social phenomena that emerges from interactions of multiple agents (e.g. the evolution of norms),
- simulating empirically based stylised social facts (e.g., typical dynamics of innovation diffusion) and
- simulating behaviour in complex environments (e.g., traffic flows, water management etc).

The conference provides an ideal setting for extended presentations and lively discussions on social simulation.

Greetings on behalf of the local organising committee,

Cesáreo Hernández
Adolfo López
Javier Pajares
José M. Galán

Program ESSA Conference 2004

	Thursday	Friday	Saturday	Sunday
9:00-10:00		Welcome by The Chancellor of University of Valladolid	Plenary session I	Plenary session II
10:00-11:45		ESSA session I	ESSA session V	ESSA session IX ESSA session X
11:45-12:15		coffee break	coffee break	Closing Session
12:15-14:00		ESSA session II	ESSA session VI	
14:00-15:30		lunch	lunch	
15:30-17:15			ESSA session VIII	
17:15-18:00		ESSA session III ESSA session IV	ESSA session VII	
18:00-19:00		18:00- Meeting Board of ESSA	18:00- Meeting Board of ESSA, PAAA & NAACSOS	
19:00-21:00	Welcome and subscription			
21:00			Conference's dinner	

Program M2M

	Thursday	Friday	Saturday
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10:00-12:00		M2M session	M2M session
11:45-12:15		coffee break	coffee break
12:15-13:15			
13:15-14:00			
14:00-15:30		lunch	lunch
15:30-17:15			
17:15-18:00			
18:00-19:00			
19:00-21:00	Welcome and subscription		
21:00			Conference's dinner

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Thursday September 16

19:00-21:00 Welcome and Subscription (Sala de Juntas)

Friday September 17

9:00-10:00 WELCOME BY THE CHANCELLOR OF UNIVERSITY OF VALLADOLID (Salón de Actos)

PRESIDENTIAL ADDRESS (Salón de Actos) (Chairman: Wander Jager)

Nigel Gilbert, *The Art of Simulation*

10:00-11:45 ESSA SESSION I (Sala de Grados) (Chairman: Javier Pajares)

10:00-10:35 Takashi Iba, *A Framework and Tools for Modeling and Simulating Societies as Evolutionary Complex Systems*

Abstract. This paper presents a framework and tools for modeling and simulating societies as evolutionary complex systems. In this paper, we introduce an object-oriented computational modeling for social sciences in order to model and simulate complex systems where the model framework, “Boxed Economy Foundation Model”(BEFM), is proposed. Moreover, in order to support making conceptual and simulation models based on BEFM, “Component Builder” (CB) is proposed. It is the tool to generate the program code just by making the diagram and setting the parameters with a graphical user interface. In addition, the component based software system “Boxed Economy Simulation Platform”(BESP) is proposed for simulating and analyzing a model. The example shows that our proposed framework and tools are quite powerful and have the potential for supporting thinking about complex societies.

10:35-11:10 Bruce Edmonds, *Artificial Science – a Simulation to Study the Social Processes of Science*

11:10-11:45 Giorgio Padrin, *Some notes on computational modeling technology for distributed interaction processes*

Abstract. This paper points at some severe drawbacks in describing and documenting socio- simulation models. Too much usually is left out unspecified or ambiguous to allow other people to hold a clear idea of the model and derive a new consistent implementation. The paper starts imagining and sketching what form and framework can be suitable for the core of a 'modeling language', sitting as high as possible near the right computational description level of models, between the free- text descriptions and implementation languages. Some notes addressing this issues are drawn and illustrated. Then it's suggested a zone in the space of core frameworks deserving exploration in the path to evolve a concrete language.

10:00-12:00 M2M WORKSHOP (Aula 3M)

10:00-11:00 Bloomquist, K.M., *A Comparison of Agent-Based Models of Income Tax Evasion*

Abstract. This paper compares three multi-agent based simulation (MABS) models of individual income tax evasion [9], [17], [21]. The models' similarities and differences are highlighted and their significance for the field of computational social science is discussed. Emphasis is placed on the importance of process validity for models intended to represent real world phenomena of interest to policy makers. Finally, it is suggested that these three examples are representative of a broader category of models referred to as models of Social Norm Promotion (SNP n) with $n = 2$ groups of influence.

11:00-12:00 Delre, S.A., Jager, W. and Janssen, M. *Percolation and innovation diffusion models compared: do network structures and social preferences matter?*

Abstract. Within the field of innovation diffusion many empirical studies have been conducted on the factors that influence the propagation of new ideas and products. From the natural sciences percolation theory has been used as a starting point to explore the dynamics of innovation diffusion, in particular the occurrence of hits and flops (Solomon *et al.*, 2000). Whereas the latter model is based on a regular network connecting individual consumers, and assumes that consumers have only individual preferences, innovation diffusion theory, as well as empirical data, suggests that consumers differ concerning the number of contacts they have and the degree to which social preferences determine their choice to adopt. To test the impacts of these assumptions on the simulated diffusion dynamics, we replicated the Solomon *et al.* (2000) model, and

experimented with scale free networks and social preferences. Results indicate that network shape and social preferences have large impacts on the chances that an innovation either becomes a hit or a flop. To increase the empirical validity of simulated diffusion dynamics we suggest assessing the network structure between consumers as well as the social relevance of the markets.

11:45-12:15 COFFEE BREAK

12:15-14:00 ESSA SESSION II (Aula 3M) (Chairman: Adolfo López)

12:15-12:50 Sylvie Occelli, *"Sensing" mobility: an outline of a MAS model for urban mobility*

Abstract. In order to develop a MAS approach to mobility phenomena a strong notion of agency is required. This implies to articulate both an analytical-epistemological and a conceptual-ontological dimension. While increasing attention is being given to the former, the latter dimension is to date still largely unexplored. The salient features which distinguish a MAS approach to mobility phenomena are emphasized. It is claimed that the possibility to take into account agents' mental worlds is both a potential and challenge of MAS approaches. Elements of a conceptual framework which may serve as a reference for designing a MAS model for urban mobility are outlined.

12:50-13:25 Tomohisa Yamashita, Kiyoshi Izumi and Koichi Kurumatani, *Effect of Car Navigation with Route Information Sharing on Improvement of Traffic Efficiency*

Abstract. This research is intended to increase drivers' utility by reducing traffic congestion. To attain our purpose, we propose a simple route guidance mechanism based on route information sharing (RIS). Drivers using the RIS give planned route details to the route information server, which then sends accumulated traffic information based on those routes to drivers. Multiagent simulation in a lattice network and a radial and ring network confirmed that: i) as the drivers using the RIS increased, the travel time of both the drivers using the RIS and the other drivers decreased; ii) the travel times of drivers using the RIS were substantially shorter than those of drivers using other mechanisms.

13:25-14:00 Rodolfo Sousa, *Income Inequality and Party Platform Convergence in an Agent-based Computational Political Economy Model*

Abstract. An agent-based political-economy stochastic model with majority voting on tax rates and spatial elections with adaptive political parties is presented. The model is designed to analyse the dynamics of a democratic social choice mechanism for broadly targeted *redistributive* government policies with *efficient and inefficient regions*. The interaction between the distribution of income and the distribution of rational self-interested political power in determining policy outcomes is explored. Intuitive results are obtained that merely replicate insights of the analytic literature, albeit in a more realistic and flexible form. However, in a calibrated model, observed levels of income inequality and empirically plausible ranges of wealth biases in political participation do not account for the cross-country variations in redistribution. Thus, a negative result is obtained that restricts the explanatory power of general interest rational choice political economy models. Possible expansions to tackle the issue include the inclusion of non-opportunistic behaviour and uncertainty.

14:00-15:30 LUNCH

15:30-18:00 ESSA SESSION III (Sala de Grados) (Chairman: Segismundo Izquierdo)

15:30-16:05 Andres Marroquin, *An Artificial Political Market - Does divided government create more deficits?*

Abstract: This paper simulates a political system using an agent-based approach to evaluate if divided governments incur in higher deficits than unified ones. We found that in our artificial society divided governments incur in a budget deficit that is 36% higher than the deficits incurred by unified governments. The driving forces of the simulation are the subjective preferences of voters for 2 public goods, local and federal public goods. As voters' preferences for public goods match the candidates' preferences the result of the budget emerges endogenously without the existence of any external revenue shock.

16:05-16:40 Klaus Jaffe, *From Sociodynamics to Synergistics: Understanding the Wealth of Nations using Simulations*

Abstract: Wealth creation is the main aim of many human activities; yet our understanding of the dynamics of the creation of wealth for whole societies or countries in the modern world is very limited. How is capital created and increased? Why are certain nations rich and other poor? What is the relationship between micro- and macro-economics? Explorations with Sociodynamica, an agent based computer simulation model, suggests that optimal behavior of individuals differs between different economies and type of societies. For example, hunter-gatherers require different individual and social skills than members of an agricultural society and those forming and industrial society. The simulations show a strong correlation between successful economies and the amount of business minded agents engaged in win-win interactions with their fellows. The simulation effort concludes that the main emergent product of societies is the creation of synergisms, which can be catalyzed through technologies that allow an accelerated increase in wealth. The results presented here show how computer simulations can aid in conceptualizing and clarifying basic theoretical problems in economics and in deepening our understanding of the historical dynamics of human societies

16:40-17:15 Volker Saggau and Paolo Patelli, *Information diffusion and decision making in artificial consumer societies*

17:25-18:00 Javier Pajares, Adolfo López-Paredes and Cesáreo Hernandez, *Agent-Based Simulation in Economics: Beyond the Neoclassical Paradigm*

Abstract. In this paper we explain some ideas about the role of agent based modelling in economics. We suggest that more realistic economic models and theories can be built under a framework which includes evolutionary thinking, experimental economics and psychology. In this context, agent based modelling can help us to translate some of the economic verbal accounting underlying those disciplines into real economic models. Moreover, experimental economics and agent based modelling jointly are the “laboratory” of the economic science. We explain the limitations of neoclassical economics in several economic disciplines, like finance, industry dynamics, economic geography, etc, and we show how agent based modelling can overcome some of these limitations.

15:30-18:00 ESSA SESSION IV (Aula 3M) (Chairman: Cesáreo Hernández)

15:30-16:05 Takao Terano, Hiroshi Takahashi and Satoru Takahashi, *Agent-Based Modeling to Investigate The Effects of Passive Strategies in a Financial Market*

Abstract. We are developing agent-based financial market models. In this paper, we discuss the effects of passive investment strategies and asset fluctuation phenomena using our agent-based simulator. Main results include that (1) passive investment is usually effective, however, the market values do not follow the fundamentals and also become unstable, when the number of passive investors is too large, (2) the variety of investors is dramatically changed, according to the evaluation criteria of investment, and (3) there remain both active and passive investors, when there are so many investors with different strategies. The contribution of the paper is to uncover the properties of passive investment strategies in a behavioral finance domain through agent-based modeling.

16:05-16:40 Arianna Dal Forno and Ugo Merlone, *Modular Pyramidal Hierarchies and Social Norms. An Agent Based Model*

Abstract. We provide a model of a hierarchical organization where artificial agents with limited individual capacity allocate their efforts in two activities: cooperation and work with supervisor. Different aspects of production and interaction are examined. The model is implemented using a software simulation platform in order to test different hypotheses about agent behavior and the resulting performance of the organization. Our results allow the identification of some aspects able to improve the organization performance even in the presence of heterogeneous and bounded rationality agents.

16:40-17:15 Laurent Salzarulo, *Formalizing self-categorization theory to simulate the formation of social groups*

Abstract. Self-categorization theory [11] is a social psychology paradigm whose aim is the study of group processes. This paper presents a mathematical model implementing a central finding of self-categorization theory: the metacontrast principle. The model allows an agent to perform self-categorization. It is validated and calibrated on a series of experimental data. It makes it possible to explain qualitatively and quantitatively certain kinds of group behaviour such as group polarization, which may or may not arise depending on social contexts. This model is a first step toward a more complete implementation of self-categorization theory, and the investigation of its consequences and predictions in complex situations through multi-agent simulation.

17:25-18:00 Diemo Urbig and Jan Lorenz, *Communication regimes in opinion dynamics: Changing the number of communicating agents*

Abstract. This article contributes in four ways to the research on time discrete continuous opinion dynamics with compromising agents. First, communication regimes are introduced as an elementary concept of opinion dynamic models. Second, we develop a model that covers two major models of continuous opinion dynamics, i.e. the basic model of Deffuant and Weisbuch as well as the model of Krause and Hegselmann. To combine these models, which handle different numbers of communicating agents, we convert the convergence parameter of Deffuant and Weisbuch into a parameter called self-support. Third, we present simulation results that shed light on how the number of communicating agents but also how the self-support affect opinion dynamics. The fourth contribution is a theoretically driven criterion when to stop a simulation and how to extrapolate to infinite many steps.

18:00- Board meeting of ESSA (Sala de juntas)

Saturday September 18

9:00-10:00 PLENARY SESSION I (Salón de Actos) (Chairman: Nigel Gilbert)

Scott Moss, *Issues in the Emergence of Social Structure*

Abstract. The literature of complex networks in general and small world networks representing social relations in particular have concentrated on algorithms for constructing such networks and such metrics and cluster coefficients, characteristic path lengths, node degree distributions and whether the networks are scale-free. There is nothing in the literature on the process of the emergence and evolution of small world networks which, it is claimed, are good representations of social networks. The objective of this paper is to investigate whether processes that conform to evidence from social psychology and cognitive science will produce small world social networks. The reported simulations indicate that clustering is a natural consequence of such evidence-based phenomena but further elaboration is necessary to maintain the connectedness of small world networks.

10:00-11:45 ESSA SESSION V (Sala de Grados) (Chairman: Wander Jager)

10:00-10:35 Candelaria Sansores, Juan Pavón and Adolfo López-Paredes, *A framework for ABSS on the grid*

Abstract. This proposal is to develop a framework for agent based social simulation on the Grid. The proposal is oriented to social systems which model size is important, thus we require means to scale up models and not limit simulation size. Furthermore, agents that comprise these models should be able to make use of distributed computational resources. Therefore, aiming to facilitate the scalability of ABSS systems, we propose the design and development of a framework for distributed simulation based on the Grid. This framework will harness Grid resources for distributed simulation execution environment. For this to achieve, a new challenge have to be addressed: the efficient execution of MAS on Grid environments.

10:35-11:10 J. Gary Polhill and Luis R. Izquierdo, *Lessons Learned from Converting the Artificial Stock Market to Interval Arithmetic*

Abstract. This paper describes work undertaken converting the Artificial Stock Market (LeBaron et al., 1999; Johnson, 2002) to using interval arithmetic instead of floating point arithmetic, the latter having been shown in an earlier article to be the cause of changed behaviour in the ASM (Polhill et al., in press). Results of both a naive (potentially automatable) conversion and one involving a more in-depth analysis of the code are presented that suggest that interval arithmetic may not be the best approach to dealing with the issue of numeric representation in the ASM. We also find that there are good reasons to suspect that floating point errors are not a significant issue for the ASM.

11:10-11:45 Yasser M. Ibrahim and Paul Scott, *Automated Abstraction for Rule-Based Multi-Agent Systems*

Abstract. Multi-Agent Systems (MASs) is a promising approach for studying human societies. The field, however, still encounters major methodological difficulties. Due to the high level of complexity that can be attained using this type of model, an efficient way for selecting an appropriate level of detail for each specific context has become a necessity. The aim of this research is to present a new approach for automatic model abstraction. The developed technique is applied to Rule-Based (RB) MASs, one of the most common types of model in social simulation. The approach has been tested on well-known model examples and proved to give advantage by replacing detailed models with simpler ones that are suitable for specific contexts.

10:00-12:00 M2M WORKSHOP (Aula 3M)

10:00-11:00 Hales, D., *Understanding Tag Systems by Comparing Tag models*

Abstract. Since Holland (1993) introduced the concept of tags a number of tag models with intriguing and potentially very useful, properties have been advanced. However there is currently little understanding as to the exact mechanisms that produce these results. Specifically it is not known what (if any) are the necessary conditions for tag systems to produce high levels of cooperation in social dilemmas. In this paper by comparing existing tag models to formulate a hypothesis and then using simulation we identify what appears to be a necessary condition for high cooperation. Previous tag models implicitly contained the condition but authors did not identify the significance of it.

11:00-12:00 Huet, S., Edwards, M. and Deffuant, G. *Taking into account the variations of social network in the mean-field approximation of the threshold behaviour diffusion model*

Abstract. We compare the individual-based “threshold model” of innovation diffusion in the version which has been studied by Young [22], with an aggregate model we derived from it. The classical threshold model supposes that an individual adopts a behaviour according to a trade-off between a social pressure and a personal interest. Our study considers only the case where all have the same threshold. We present an aggregated model, which takes into account variations of the neighbourhood sizes, whereas previous work assumed this size fixed [6]. The comparison between the aggregated models (the first one assuming a neighbourhood size and the second one, a variable one) points out an improvement of the approximation in most of the value of parameter space. Remaining differences between both models give us some clues about the specific ability of individual-based model to maintain a minority behaviour which becomes a majority by an addition of stochastic effects.

Martin, S., Deffuant, G., Nadal, J-P and Weisbuch, G. *Comparing the binary opinion vector version of the BC model with different approximating aggregated dynamics*

Abstract. We study the binary vector version of the «bounded confidence» model. In this model, random pairs of agents influence each other when the Hamming distance between their opinion vectors is below a given threshold. In this case, one of the agents modifies one bit of the opinion vector (chosen randomly), to reduce its Hamming distance with its interlocutor. High thresholds yield convergence to a single opinion vector (consensus), whereas low thresholds result in several opinion clusters. The present paper is first based on a set of exhaustive simulations for opinion vectors of small dimension, which gives a better understanding of the conditions that lead to a consensus or to a multiplicity of clusters. We next try to explain the results with approximating aggregated dynamics, governed by a master equation. We found that master equations similar to the ones approximating Axelrod's model do not capture the essential irreversible behaviors of the model [1]. We propose a specific aggregated model which gives a good approximation of the agent based simulation results.

11:45-12:15 COFFEE BREAK

12:15-14:00 ESSA SESSION VI (Aula 3M) (Chairman: Cesáreo Hernandez)

12:15-12:50 Luis R. Izquierdo and José M. Galán, *Appearances can be deceiving: Lessons learned reimplementing Axelrod's "Evolutionary approach to norms"*

Abstract. In this paper we try to replicate the simulation results reported by Axelrod [1] in an influential paper on the evolution of social norms. Our study shows that Axelrod's results are not as reliable as one would desire. We can obtain the opposite results by running the model for longer, by slightly modifying some of the parameters, or by changing some arbitrary assumptions in the model. This reimplementation exercise illustrates the importance of running stochastic simulations several times, of exploring the parameter space adequately, of complementing simulation with analytical work, and of being aware of the scope of our simulation models.

12:50-13:25 Panomsak Promburom, *Participatory Multi-agent Systems Modeling for Natural Resource Management in a Highland Watershed of Northern Thailand*

Abstract. Scarce farm land and water resources in the highland watersheds of northern Thailand coupled with multiple users have led to conflicts among stakeholders who play important roles in the system dynamics. Integrating companion modeling and multi-agent systems (MAS) can facilitate adaptive learning processes to result in a decentralized collective management strategy that meets the balanced needs of all parties. However, this requires innovative methods and tools, and coordination from all stakeholders involved in the process. This paper presents the use of role-playing games (RPG) with local stakeholders using simplified rules and environment to facilitate dialog among the party and to understand stakeholder behavior in using and managing land and forest resources. Knowledge obtained from the game and following interviews was used to develop MAS model to reproduce the context of the games. The model will be used in further participatory MAS modeling processes.

13:25-14:00 Nicholas M. Gotts and Dawn C. Parker, *Modelling Size Distributions of Rural Land Holdings in Scotland*

Abstract. The paper reports ongoing investigations on the size distribution of rural land holdings in the real world (specifically, in Scotland), and in the output of two simulation programs: a simple numerically-based simulation of the partition and repartition of a fixed-size resource between a fixed set of entities (referred to here as R-SG), and an agent-based model of rural land use and land ownership change, FEARLUS.

14:00-15:30 LUNCH

15:30-18:00 ESSA SESSION VII (Aula 3M) (Chairman: Javier Pajares)

15:30-16:05 Tatsuya Nomura, *Analysis and Simulation of Group Dynamics Based on Heider's Balance Theory and a Finite Markov Chain*

Abstract. Heider's balance theory is one of theories on micro characteristics of triad relations in social psychology. However, it has not sufficiently been discussed what relations there are between group dynamics and this micro characteristic, that is, what situations appear in convergence of the group dynamics based on balance of individual triads. This paper proposes a formalization of this group dynamics based on balance of individual triads. This paper proposes a formalization of this group dynamics as a finite Markov chain, mathematically analyzes absorbing states of this Markov chain, and verifies their characteristics based on computer simulations. Moreover, it considers influence of a person fixing relations to others through the process in this Markov chain

16:05-16:40 Kees Zoethout, Wander Jager and Eric Molleman, *Simulating the Emergence of Job Rotation*

Abstract. Job rotation may decrease negative consequences of boredom, may results in more flexibility within a work team and may lead to a higher task performance. It may emerge from a task-performing group or may be designed to improve the performance of a group. This paper compares selforganising work groups in which job rotation emerges with work groups that are designed to rotate jobs by using computer simulation. On the basis of this comparison, we propose some advantages and drawbacks of both ways of organising.

16:40-17:15 Marta Posada, Cesáreo Hernandez and Adolfo López-Paredes, *An Agent Based Analysis of the Emission Permits Options*

Abstract. Since the “Kyoto Protocol” a milestone in worldwide efforts towards global warming abatement, many countries are due to design a proper trading of GHG emissions permits. Thus the analysis of the auction institution becomes a major issue. There have been a substantial analytical effort to understand the EPA emissions trading mechanism with very poor results even under extreme simplifying assumptions. EE has revealed why the EPA was to end up as a failure. Why not to take a further step and experiment with soft agents to engineer the appropriate trading system? After showing that we could have advanced the EPA’s failure from an ABM approach we argue that the CDA is a suitable choice for the trading permits. We analyse the CDA under different strategic behaviour of buyers and sellers using the same ABM approach, extending previous works with evolutionary adaptation and learning.

17:25-18:00 Ryunosuke Tsuya, Naoto Sato, Takashi Iba and Yoshiyasu Takefuji, *Analysis on the factor of price volatility in deregulated electric power market*

Abstract. This paper presents agent-based simulation models of deregulated electricity market in order to investigate the possibility that the electricity price fluctuation is caused by the exercise of market power. Monopoly Market Model and Competitive Market Model are created. These models are based on Boxed Economy Foundation Model (BEFM) as model framework and are simulated on Boxed Economy Simulation Platform (BESP) as simulation platform. The result of these simulations shows two points of contention. First, both models can continue dominating a market and show the exercise of market power in the situation of electricity demanded increasing. Second, the growth of electricity generated often creates an increase in electricity price by the pricing system in Competition Market Model. It could lead to the misinterpretation that electricity generated decreases in market.

15:30-18:00 ESSA SESSION VIII (Sala de Grados) (Chairman: Jose M. Galan)

15:30-16:05 Andres Marroquin and Holly Ann Potter, *The Effects of a Minimum Wage on the Labor Market: A Complex Perspective*

Abstract: In this paper we adopt a different approach to understand a labor market. We built a competitive labor market from the bottom-up; it is composed by four kinds of employees and four kinds of employers. In the simulation employees and employers act to reach a minimum level of satisfaction (on the lines of Simon, 1947; and Axtell and Epstein, 1996), which means that they don't follow utility maximizing behavior. With a few basic rules we were able to determine the effect of a minimum wage on unemployment rates, total wages, and average wages in the different populations. Our labor market is dynamic; and therefore significantly different than the standard supply and demand approach. The model can also operate under both competitive and monopsony assumptions. Another advantage of the model is that it is possible to make changes to the parameters and evaluate the effect on the independent variables. Our results confirm the theoretical agreements and offer evidence for increasing minimum wage elasticity, especially in the case of subjects defined as immigrants and teenagers. In the monopsony case the results also resemble those predicted by the theory, nevertheless we found that at high levels of the minimum wage, the wages for the total economy decrease; the effects on each group, however, are not clear and show a complex pattern.

16:05-16:40 Arvid O.I. Hoffmann and Wander Jager, *Formalizing the effect of personal needs, social interaction and network-structures in simulating stock-market dynamics.*

Abstract. The frameworks used by finance scholars, both traditional as well as modern and behavioral ones, have problems describing and explaining investor and stock market behavior. These frameworks are unable to explain 'aberrant' stock market and investor phenomena like bubbles, crashes, investor mania's and herding behavior. The authors build on existing work to provide an alternative integrated behavioral framework to describe and explain investor's behavior and stock market dynamics. This framework is built on three main components: needs, decision making theory, and (social) network effects. This framework will be used to build a future simulation model of investor behavior and to generate stock market dynamics. A brief outline of the design of these simulation experiments will be given.

16:40-17:15 Kiyoshi Izumi, Tomohisa Yamashita and Koichi Kurumatani, *Reward Mechanism of Agent Types in Minority Games*

Abstract. This paper proposes an indirect control method by operating the kind of information given to users and changing their learning types, for efficient resource allocation. We constructed three types of agents, which are different in efficiency and accuracy of learning. First, they were compared using acquired payoff in a minority game, which is a simplified model of resource allocation problems. As a result, there were 4 distinct areas according to the two conditions, memory length and learning speed of the others' model. Next, our control method was tested in these 4 areas. As a result, the number of the agents who use each resource was stabilized and all agents' average profit increased by this control method.

18:00- Board meeting of ESSA, with NAACSOS and PAAA (Sala de Juntas)

21:00- Conference's dinner

Sunday September 19

9:00-10:00 PLENARY SESSION II (Salón de Actos) (Chairman: Bruce Edmonds)

Guillaume Deffuant, Frédéric Amblard and Gérard Weisbuch,
Modelling Group Opinion Shift to Extreme: the Smooth Bounded Confidence Model

Abstract: We propose a new variant of the bounded confidence (BC) model which is based on a Gaussian function. This model considers individuals with a continuous opinion and an uncertainty. Individuals interact by random pairs, and attract each other's opinion proportionally to a Gaussian function of the distance between their opinions. We show that this model presents a shift to the extreme when we introduce extremists (very convinced individuals with extreme opinions) in the population, even if there is the same number of extremists located at each extreme. The social psychology literature does not report experiments in precisely such conditions, but a huge number of shifts to the extreme in a context of free discussions aiming to achieve a consensus. We propose a modification of the smooth BC model to account for the social psychology data and theories related to this phenomenon. The modification is based on the hypothesis of perspective taking (empathy) in the context of consensus seeking. In our modelling approach, some theories which are presented as concurrent in the social psychology literature appear as complementary, and our results favour the leadership theory with respect to the social comparison theory.

10:00-11:45 ESSA SESSION IX (Aula 3M) (Chairman: Cesáreo Hernández)

10:00-10:35 Hans-Joachim Mosler and Robert Tobias,
Simulation of collective action based on empirical data

Abstract. Taking collective action as an example, the paper shows that ABS is particularly well suited for representation and explanation of the emergence of dynamic processes out of the interaction of different processes at multiple levels. First, a theory is developed that explains the dynamics of collective action based on the interaction of individual-internal processes, social influence processes, and diffusion processes. The simulation model is based on this theory and then calibrated with data from a real-world collective action. “What if” scenarios demonstrate that the increasing number of participants in a collective action is determined mainly by diffusion processes, but that ultimately, the final number of participants is influenced by individual processes and social processes.

10:35-11:10 K. Klemm, V.M. Eguíluz, R. Toral and M. San Miguel,
Globalization, cultural drift and social networks

Abstract. We study a one-dimensional version of Axelrod’s model of cultural transmission. We classify the equilibrium configurations and analyze their stability. Below a critical threshold, an initially diverse population will converge to a monocultural equilibrium, or ordered state. Above this threshold, the dynamics settle to a multicultural or polarized state. These multicultural attractors are not stable, so that small local perturbations can drive the system towards a monocultural state. Cultural drift is modeled by perturbations (noise) acting at a finite rate. If the noise rate is small, the system reaches a monocultural state. However, if the noise rate is above a size-dependent critical value, noise sustains a polarized dynamical state.

11:10-11:45 Adolfo López-Paredes, Javier Pajares and Cesáreo Hernandez, *Strategic Behaviour in Oligopoly. An ABS Approach*

Abstract. In this paper we propose to study some existing agent based models and explore the subsumed tag-based mechanisms. Emergent patterns of social behaviour in complex systems can be explained by means of tag mechanisms. The main aim is to provide a set of well validated mechanisms to apply in the analysis of a wide range of complex systems. Those mechanisms should be the result of the analysis and observation of real systems. We demonstrate in the first section that this research program is consistent with the philosophical foundations of systemism, Our proposal is illustrated with an agent (tag-based) model of emergence of classes. By replication we confirmed the published results. Notwithstanding, we have substituted the maximizing decision of agents by a simple and deterministic rule-of-thumb which is independent of their respective tags. We conclude that dynamics affect the global system and that groups and norms emerge even when agents don't play strategically.

10:00-11:45 ESSA SESSION X (Sala de Grados) (Chairman: Jose M. Galan)

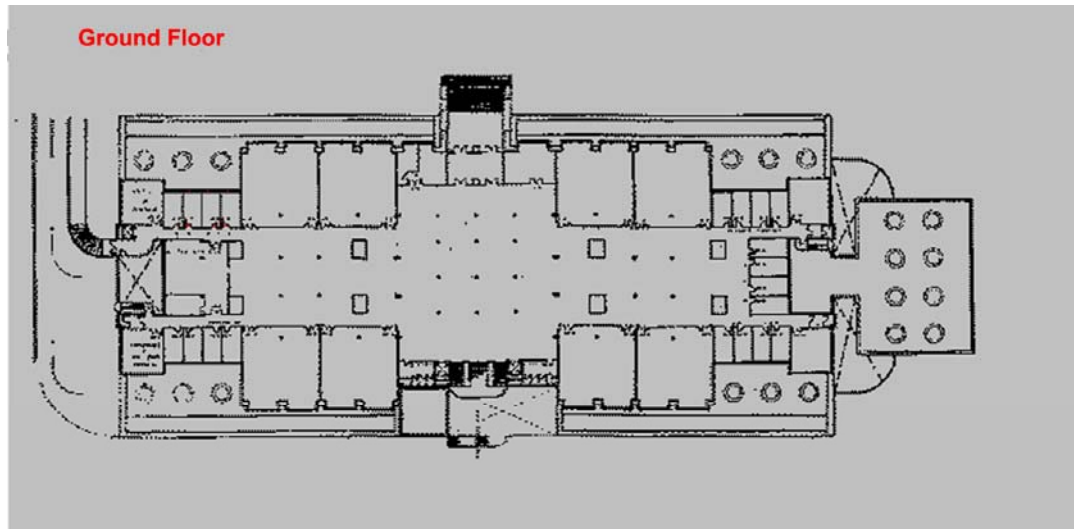
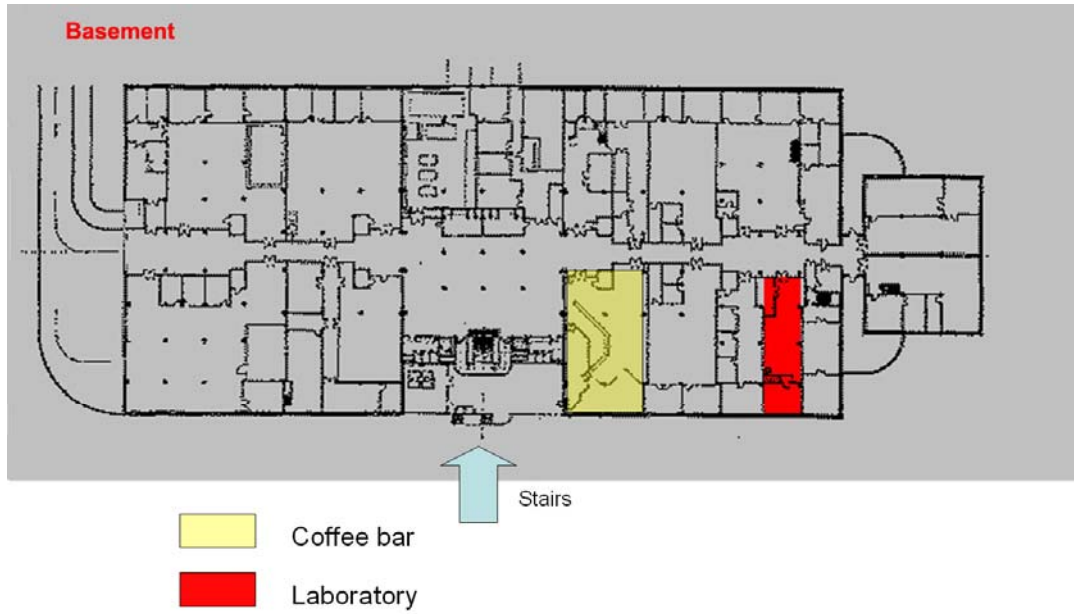
10:00-10:35 Andrea Morone, Piergiuseppe Morone and Richard Taylor, *A Laboratory Experiment of Knowledge Diffusion Dynamics*

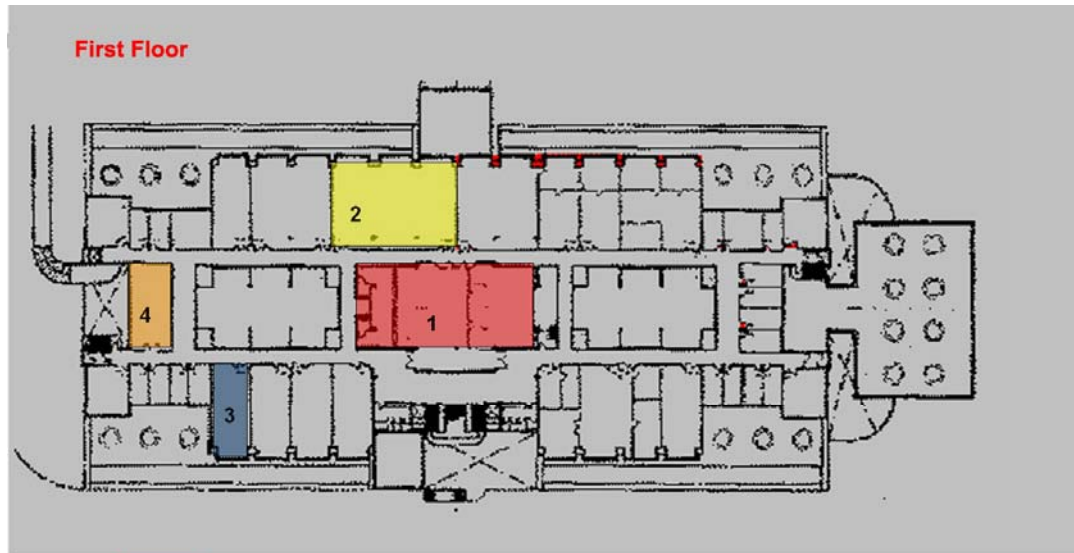
Abstract. This paper aims to study, by means of a laboratory experiment and a simulation model, some of the mechanisms which dominate the phenomenon of knowledge diffusion in the process that is called 'interactive learning'. We examine how knowledge spreads in different networks in which agents interact by word of mouth. We define a regular network, a randomly generated network and a small world network structured as graphs consisting of agents (vertices) and connections (edges), situated on a wrapped grid forming a lattice. The target of the paper is to identify the key factors which affect the speed and the distribution of knowledge diffusion. We will show how these factors can be classified as follows: (1) learning strategies adopted by heterogeneous agents; (2) network architecture within which the interaction takes place; (3) geographical distribution of agents and their relative initial levels of knowledge. We shall also attempt to single out the relative effect of each of the above factors.

10:35-11:10 Jennifer Kunz, *Organisational Learning as Consequence of the Individual Decision Processes - A Computer-based Analysis of Organisational Learning Processes*

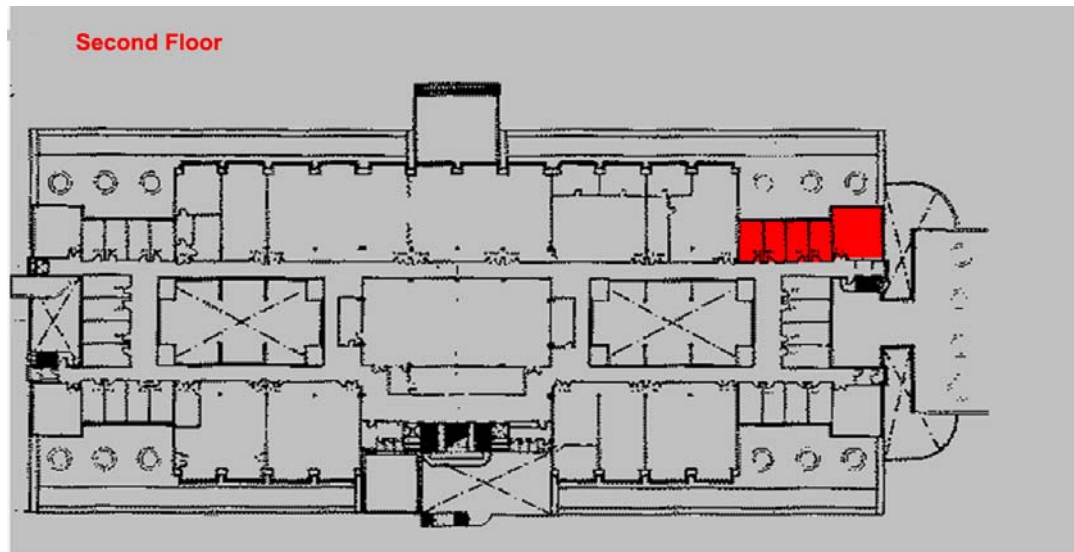
Abstract: There is an ongoing discussion concerning the interplay between knowledge exploration and knowledge exploitation and its influence on organizational performance. On the one hand, increasing environmental dynamic requires a continuously changing organizational knowledge base. On the other hand, the pure exploration of new knowledge leads to a decrease of organizational performance in the long run, because the organization can not profit from already existing experience. This paper analyzes the influence of different environmental dynamics on the success of pure explorative and exploitative knowledge strategies versus a mixed strategy.

School Maps





- 1. Salón de Actos
- 2. Aula 3M
- 3. Sala de Grados
- 4. Sala de Juntas



- Department

