
PROGRAM GUIDE

IEEE INCOS-2011

*The Third IEEE International Conference on
Intelligent Networking and Collaborative Systems*



November 30th - December 2nd, 2011

Fukuoka Institute of Technology (FIT)

Fukuoka, JAPAN

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IEEE INCOS-2011 Conference Organizing Committee

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Fatos Xhafa, Technical University of Catalonia, Spain

Ajith Abraham, Machine Intelligence Research Labs (MIR Labs), USA

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Mario Köppen, KIT, Japan

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3. Wireless and Sensor Systems for Intelligent Networking and Collaborative Systems

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4. Networking and Collaboration at School

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Simos Retalis, University of Piraeus, Greece

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5. Collaborative Healthcare Systems: Issues, Solutions and Trends

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Sohaib Majzoub, American University in Dubai, UAE

Hicham Elzabadani, American University in Dubai, Dubai

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Mohammad Samaka, Qatar University, Qatar

Yuki Arase, Microsoft Research Asia, Japan

Nasser Nassiri, HCT, UAE

Min Wu, Oracle, USA

6. Intelligent Collaborative Systems for Work and Learning, Virtual Organizations and Campuses

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Thanasis Daradoumis, University of the Aegean, Greece
Agoritsa Gogoulou, University of Athens, Greece
Evangelia Gouli, University of the Aegean, Greece

7. Software Engineering for Intelligent Networking and Collaborative Systems

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Martin Gaedke, University of Karlsruhe, Germany
Karl Lieberherr, Northeastern University Boston, USA
Somkiat Kitjongthawonkul, Australian Catholic University, Australia

8. Data Mining and Knowledge Management for Intelligent Networking and Collaborative Systems

Marenglen Biba, Department of Computer Science, University of New York Tirana, Albania (Chair)
Donato Malerba, University of Bari, Italy
Janusz Wojtusiak, George Mason University, USA
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Stefano Ferilli, University of Bari, Italy
Alfredo Cuzzocrea, ICAR-CNR and University of Calabria, Italy
Keivan KianMehr, University of Western Ontario, Canada
Piero Leo, IBM Italy, Italy
Henryk Rybinski, Warsaw University of Technology, Poland
Djamel Zighed, Universite Lumiere Lyon 2, France

9. Intelligent Networking for Social Networks

Hamamache Kheddouci, Universite Claude Bernard Lyon 1, France (Chair)
Reda Alhadj, University of Calgary, Canada
Dan Braha, University of Massachusetts, USA
Massimo Marchiori, W3C-MIT, USA

10. Security, Organization, Management and Autonomic Computing for Intelligent Networking and Collaborative Systems

Xiaofeng Chen, Xidian University, China (Chair)

Hui Li, Xidian University, China

Xinyi Huang, Institute for Infocomm Research, Singapore

Willy Susilo, University of Wollongong, Australia

Qianhong Wu, Universitat Rovira i Virgili, Spain

Fangguo Zhang, Sun Yat-Sen Univeristy, China

Jin Li, Guangzhou University, China

Ashley Chonka, Deakin University/INRIA, Australia

Bo Qin, Universitat Rovira i Vergili, Spain

Lei Zhang, East China Normal University, China

Xinghua Li, Xidian University, China

Yulong Shen, Xidian University, China

Qiang Tang, University of Twente, Netherlands

Joonsang Baek, Khalifa University of Science, Technology and Research (KUSTAR), UAE

Jian Weng, Jinan University, China

Qiong Huang, City University of Hong Kong, China

Shengli Liu, Shanghai Jiao Tong University, China

11. Poster Papers Track

Masato Tsuru, KIT, Japan (Chair)

Kaori Yoshida, KIT, Japan

Yoshiaki Hori, Kyushu University, Japan

Manabu Kato, Ariake National College of Technology, Japan

Hiroyuki Koga, The University of Kitakyushu, Japan

Hideaki Iiduka, KIT, Japan



** Best papers awards are supported by The International Fuzzy Systems Association (IFSA).

Welcome Message from IEEE INCoS-2011 Chairs

Welcome to the 3d IEEE International Conference on Intelligent Networking and Collaborative Systems (IEEE INCOS-2011) held on 30th November – 2nd December, 2011 at Fukuoka Institute of Technology, Fukuoka, Japan. The conference is technically co-sponsored by IEEE Systems, Man & Cybernetics (IEEE SMC Society), Kyushu Institute of Technology, Japan, Fukuoka Institute of Technology (FIT), Japan and Technical University of Catalonia, Spain.

IEEE INCOS is a multidisciplinary conference that covers latest advances in intelligent social networks and collaborative systems. With the fast development of the Internet, we are experiencing a shift from the traditional sharing of information and applications as the main purpose of the Web to an emergent paradigm, which locates people at the very centre of networks and exploits the value of people's connections and relations. Web 2.0 has come to play a major role in this context by enabling a new generation of social networks and web-based communities and dramatically changing the way we use and interact with the Web. Social network analysis is also a rapidly growing field to investigate the dynamics and structure of intelligent Web-based networking and collaborative systems.

Virtual campuses and organizations strongly leverage intelligent networking and collaborative systems by a great variety of formal and informal electronic relations, such as business-to-business, peer-to-peer and many types of online collaborative learning interactions. This has resulted in entangled systems that need to be managed efficiently and in an autonomous way. In addition, latest and powerful technologies based on Grid and Wireless infrastructure as well as Cloud computing are currently enhancing collaborative and networking applications a great deal but also facing new issues and challenges. Well-known social networks lack of knowledge management and adaptive solutions and the information shared among peers is rather static. Virtual communities of practice also provide poorly interactive solutions and lack of full support for organization, management, mobility and security, which have become major research issues in networked collaborative systems.

The principal aim of this conference is to stimulate research that will lead to the creation of responsive environments for networking and, at longer-term, the development of adaptive, secure, mobile, and intuitive intelligent systems for collaborative work and learning. IEEE INCOS addresses a large number of themes and focuses on the following research tracks:

- Methodology, Analysis & Sustainability of Intelligent Networking and Collaborative Systems
- Grid And P2P Distributed Infrastructure for Intelligent Networking and Collaborative Systems
- Wireless and Sensor Systems for Intelligent Networking and Collaborative Systems
- Networking and Collaboration at Schools
- Intelligent Networking for Virtual Organizations and Campuses
- Intelligent Networking for Social Networks
- Intelligent Collaborative Systems for Work and Learning
- Data Mining and Knowledge Management for Intelligent Networking and Collaborative Systems
- Collaborative Healthcare Systems: Issues, Solutions and Trends

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- Software Engineering for Intelligent Networking And Collaborative Systems
 - Security, Organization, Management and Autonomic Computing for Intelligent Networking and Collaborative Systems.

The conference program committee had a very challenging task of choosing high quality submissions from a total of 180 submissions received. After a peer review process in which each paper was reviewed by at least two referees (in average three reviews per submission), there were accepted 48 regular papers, 95 workshop papers and 11 posters.

This edition of IEEE INCOS was honoured to have the presence of the following plenary speakers.

Prof. Timothy K. Shih, National Central University, Taiwan

Prof. Prof. Yuji Oie, Vice President, Kyushu Institute of Technology, Japan

Many people have collaborated and worked hard to produce a successful IEEE INCOS 2011 conference. First and foremost, we would like to thank all the authors for their continuing support to the conference by submitting their research work to the conference, for their presentations and discussions during the conference. We thank Program Committee members and external reviewers, who carried out the most difficult work by carefully evaluating the submissions and providing constructive feedback. We would like to thank the track chairs for their work on promoting the conference and their tracks. We appreciate Workshops Co-Chairs Dr Santi Caballé and Dr Kaori Yoshida for the successful organization of the 6 workshops within the conference. We would like to give special thanks to the members of the local organizing committee. We are very grateful to IEEE SMC as well as several academic institutions for their technical sponsorship and assistance.

We would like to thank Fukuoka Institute of Technology (FIT) for giving us the possibility to organize the conference in its beautiful Campus and new FIT Hall, and Fukuoka City and Fukuoka Convention Bureau for their kind support and help.

Finally, we hope that you will find these proceedings to be a valuable resource in your professional, research and educational activities!

We look forward to seeing you again in forthcoming edition of IEEE INCoS conference!

General Chairs

Leonard Barolli, Fukuoka Institute of Technology (FIT), Japan

Fatos Xhafa, Technical University of Catalonia (UPC), Spain

Ajith Abraham, Machine Intelligence Research Labs (MIR Labs), USA

Programme Committee Chairs

Janusz Kacprzyk, Polish Academy of Sciences, Poland

Mario Köppen, Kyushu Institute of Technology (KIT), Japan

Fukuoka, Japan

September 2011

Welcome Message from IEEE INCoS-2011 Workshops Co-Chairs

Welcome to the Workshops of the 3d IEEE International Conference on Intelligent Networking and Collaborative Systems (IEEE INCOS-2011) held 30th November – 2nd December, 2011 at Fukuoka Institute of Technology, Fukuoka, Japan. The conference is technically co-sponsored by IEEE Systems, Man & Cybernetics (IEEE SMC Society), Fukuoka Institute of Technology (FIT), Japan, Kyushu Institute of Technology (KIT), Japan, and Technical University of Catalonia, Spain.

In this edition of the conference, there were held one International Symposium and five workshops, which complemented the INCOS main themes with specific themes and research issues and challenges. These included:

- 13th MNSA-2011: The 13th International Symposium on Multimedia Network Systems and Applications
- 4th WIND-2011: 4th International Workshop on Information Network Design
- 3rd MIST-2011: 3rd International Workshop on Managing Insider Security Threats
- 2nd CIDM-2011: 2nd International Workshop on Computational Intelligence for Disaster Management
- 1st ALICE-2011: 1st International Workshop on Adaptive Learning via Interactive, Collaborative and Emotional Approaches
- 1st WKED-2011: 1st International Workshop on Kansei Engineering and Design

We would like to thank the workshop organizers for their great efforts and hard work in proposing the workshop, selecting the papers, the interesting programs and for the arrangements of the workshop during the conference days. We are grateful to the IEEE INCoS-2011 Conference Chairs for inviting us to be the workshops co-chairs of the conference. We hope you will enjoy the workshops programs and discussions during the conference days and have great time in Fukuoka, Japan!

IEEE INCoS-2011 Workshops Co-Chairs

Santi Caballé, Open University of Catalonia, Spain

Kaori Yoshida, Kyushu Institute of Technology, Japan

Welcome Message from MNSA-2011 International Symposium Co-Chairs

It is our great pleasure to welcome you to the 13-th International Symposium on Multimedia Network Systems and Applications (MNSA-2011), which will be held in conjunction with the 3-rd IEEE International Conference on Intelligent Networking and Collaborative Systems (IEEE INCoS-2011) in Fukuoka Institute of Technology, Fukuoka, Japan, from November 30 to December 2, 2011.

MNSA started in 1999 as an International Workshop and has been held successfully for 12 years in many countries such as USA, Germany, Austria, Japan, Canada, China and Italy. This international symposium is a forum for sharing ideas and research work in the emerging areas of multimedia networking and systems.

Networks of today are going through a rapid evolution and the growing popularity of wired and wireless networks, multimedia network systems and applications are changing our daily life. In the last few years, we have observed an explosive growth of multimedia computing, communication and applications. This revolution is transforming the way people lives, works and interacts with each other, and is impacting the way business, education, entertainment, and health care are operating. Presently, a lot of research on high-speed networks and multimedia communication is going on. The papers included in this symposium cover aspects of P2P systems, multimedia applications, distributed computing systems and wireless networks.

For the MNSA-2011, we received very high quality submissions and we accepted 41 papers, which will be presented in 13 sessions. Many people contributed to the success of MNSA-2011. First, we would like to thank the organizing committee of IEEE INCoS-2011 International Conference for giving us the opportunity to organize MNSA-2011. We would like to thank all authors for submitting their research work and for their participation.

We are looking forward to meet them again in the forthcoming editions of the workshop. We would like to express our appreciation to MNSA-2011 reviewers who carefully evaluated the submitted papers. Finally, we would like to thank the Local Arrangement Chairs for the local arrangement of the workshop.

We hope you will enjoy the workshop and have a great time in Fukuoka.

MNSA-2011 International Symposium Organizers

Makoto Takizawa, Seikei University, Japan
Leonard Barolli, Fukuoka Institute of Technology, Japan
Timothy Shih, National Central University, Taiwan
Yoshitaka Shibata, Iwate Prefectural University, Japan

MNSA-2011 International Symposium General Co-Chairs

Minoru Uehara, Toyo University, Japan
Markus Alekxy, ABB AG Corporate Research Centre, Germany

MNSA-2011 International Symposium Program Co-Chairs

Hui-Huang Hsu, Tamkang University, Taiwan
Tomoya Enokido, Risho University, Japan

Welcome Message from WIND-2011 International Workshop Co-Chairs

Nowadays the Internet is playing a role of social and economical infrastructure and is expected to support not only comfortable communication and information dissemination but also any kind of intelligent and collaborative activities in a dependable manner. However, the explosive growth of its usage with diversifying the communication technologies and the service applications makes it difficult to manage efficient sharing of the Internet. In addition, an inconsistency between Internet technologies and the human society forces a complex and unpredictable tension among end-users, applications, and ISPs (Internet Service Providers). It is thought, therefore, that the Internet is approaching a turning point and there might be the need for rethinking and redesigning the entire system composed of the human society, nature, and the Internet. To solve the problems across multiple layers on a large-scale and complex system and to design the entire system of systems towards future information networks for human/social orchestration, a new tide of multi-perspective and multi-disciplinary research is essential. It will involve not only the network engineering (network routing, mobile and wireless networks, network measurement and management, high-speed networks, etc.) and the networked applications (robotics, distributed computing, human computer interactions, Kansei information processing, etc.), but the network science (providing new tools to understand and control the huge-scale complex systems based on theories, e.g., graph theory, game theory, information theory, learning theory, statistical physics, etc.) and the social science (enabling safe, secure, and human-centric application principles and business-models).

The Information Network Design Workshop aims at exploring ongoing efforts in the theory and application on a wide variety of research fields related to the design of information networks and resource sharing in the networks. The workshop provides an opportunity for academic/industry researchers and professionals to share, exchange, and review recent advances on information network design research. Original contribution describing recent modeling, analysis, and experiment on network design research with particular, but not exclusive, regard to:

- Large scale and/or Complex networks
- Cross layered networks
- Overlay and/or P2P networks
- Sensor and/or Mobile ad-hoc networks
- Delay/disruption tolerant networks
- Social networks
- Applications on networks
- Fundamental theories for network design

The workshop will present 9 papers, covering newest and quality research contributions to the engineering discipline of network design, control, management and maintenance. The workshop organizers would like to thank all authors who have contributed to the success of this workshop. Also thanks go to the members of the International Program Committee, whose efforts were most helpful to ensure highest quality of paper selection: Leonard Barolli, Fatos Xhafa, Masato Uchida, Hideaki Iiduka, Kenji Kawahara, Hiroshi Koide, Takeshi Ikenaga, Yutaka Nakamura, Kei Ohnishi, Kenichi Kourai, Yutaka Fukuda, and Kazuya Tsukamoto. Then we have to

thank all the organizers of IEEE INCoS 2011 conference, for welcoming this workshop and whose help and assistance was always highly appreciated, especially for the continuous efforts of Leonard Barolli, Fatos Xhafa, and Santi Caballe.

We wish all participants and contributors to spend an event with high research impact, interesting discussions, exchange of research ideas, and paving the future research cooperation.

WIND-2011 International Workshop Organizers

Masaki Aida (Tokyo Metropolitan University, Japan)

Akira Arutaki (Kyushu Institute of Technology, Japan)

Mario Koeppen (Kyushu Institute of Technology, Japan)

Hiroyoshi Miwa (Kwansei Gakuin University, Japan)

Gunther Raidl (Vienna University of Technology, Austria)

Masato Tsuru (Kyushu Institute of Technology, Japan)

Kaori Yoshida (Kyushu Institute of Technology, Japan)

Welcome Message from MIST-2011 International Workshop Co-Chairs

Welcome to the 3rd International Workshop on International Workshop on Managing Insider Security Threats (MIST-2011), which will be held in conjunction with the 3-rd IEEE International Conference on Intelligent Networking and Collaborative Systems (IEEE INCoS-2011) in Fukuoka Institute of Technology, Fukuoka, Japan, from November 30 to December 2, 2011.

During the past decades, information security developments have been mainly concerned with preventing illegal attacks by outsiders, such as hacking, virus propagation, and spyware. However, nowadays information leakage caused by insiders who are legally authorized to have access to some corporate information is increasing dramatically. These leakages can cause significant damages such as weakening the competitiveness of companies (and even countries). Information leakage caused by insiders occurs less frequently than information leakage caused by outsiders, but the financial damage is much greater. Countermeasures in terms of physical, managerial, and technical aspects are necessary to construct an integral security management system to protect companies' major information assets from unauthorized internal attackers. MIST-2011 aims to showcase the most recent challenges and advances in security technologies and management systems to prevent leakage of organizations' information caused by insiders. It may also include state-of-the-art surveys and case analyses of practical significance.

We expect that the workshop will be a trigger for further research and technology improvement related to this important subject. This year total 18 high qualified papers will be presented in the five sessions of MIST-2011. Also, Prof. Dieter Gollmann (Hamburg University of Technology, Germany) will deliver a keynote speech titled "From Insider Threats to Business Processes that are Secure-by-Design", and Dr. Shinsaku Kiyomoto (KDDI R&D Lab., Japan) will deliver an invited industrial talk titled "On Data Importance Analysis".

It is impossible to organize such a successful program without the help of many individuals. We would like to express our special thanks to the authors of the submitted papers, and to the program committee members, who provided timely and significant reviews. In addition, we would like to thank Prof. Kouichi Sakurai and Dr. Yoshiaki Hori (Sakurai Laboratory at Kyushu University, Japan) for their financial support to our workshop. Finally, we would like to thank General Chairs of IEEE INCoS-2011, Prof. Leonard Barolli (Fukuoka Institute of Technology, Japan), Dr. Fatos Xhafa (Technical University of Catalonia, Spain), and Dr. Ajith Abraham (Machine Intelligence Research Labs (MIR Labs), USA) for their countless support.

We hope all of you enjoy MIST-2011 and find this a productive opportunity to exchange ideas with many researchers.

MIST-2011 International Workshop Organizers

Ilsun You, Korean Bible University, South Korea

Christian W. Probst, Technical University of Denmark, Denmark

Yoshiaki Hori, Kyushu University, Japan

MIST-2011 International Workshop Advisory Committee

Kouichi Sakurai, Kyushu University, Japan

Welcome Message from CIDM-2011 International Workshop Organizers

It is our great pleasure to welcome you to the 2nd International Workshop on Computational Intelligence for Disaster Management (CIDM-2011), which will be held in conjunction with the 3-rd IEEE International Conference on Intelligent Networking and Collaborative Systems (IEEE INCoS-2011) in Fukuoka Institute of Technology, Fukuoka, Japan, from November 30 to December 2, 2011.

The 2nd International Workshop on Computational Intelligence for Disaster Management (CIDM-2011) is dedicated to the dissemination of completed or work in progress original contributions that are related to the theories, practices and concepts of emerging computational and collaborative technologies for the purpose of managing disasters. Various advanced and emerging computational paradigms could be applied as a means to mitigate and prepare for, respond to and recover from growing occurrences of natural and man-made disasters. Stakeholders in disaster management settings often find the effective and efficient utilisation of emerging technologies quite a challenging process but very frequently a critical computational inclusion to the intelligence that it is required in the decision-making for protecting lives, organizations, property, environment and technical infrastructures. CIDM-2011 aims to prompt relevant discussion and highlight issues related to the stakeholders' needs and the available technologies, which could be applied to support the operation and functioning during the aforementioned disaster stages. Thus, advances of applicable technologies including smart spaces and sensors, context-aware, situated and pervasive computing, geographical information systems, ad-hoc mobile networks, wireless communications, grid and cloud computing, social networks, Web 2.0 and crowd sourcing are discussed. Specifically, the scope of CIDM-2011 is to demonstrate the increased applicability and impact of computational intelligence in satisfying the disaster's management domain challenging requirements.

For the CIDM-2011, we received very high quality submissions and we accepted 10 papers, which will be presented in 3 sessions. Many people contributed to the success of CIDM-2011. First, we would like to thank the organizing committee of IEEE INCoS-2011 International Conference for giving us the opportunity to organize CIDM-2011. We would like to thank all the authors of the workshop for submitting their research works and for their participation. We are looking forward to meet them again in the forthcoming editions of the workshop. We would like to express our appreciation to CIDM-2011 reviewers who carefully evaluated the submitted papers. Finally, we would like to thank the Local Arrangement Chairs for the local arrangement of the workshop.

We hope you will enjoy the workshop and have a great time in Fukuoka.

CIDM-2011 International Workshop Co-Chairs

Eleana Asimakopoulou, University of Bedfordshire, UK

Nik Bessis, University of Derby, UK

Fatos Xhafa, Technical University of Catalonia, Spain

Welcome Message from ALICE-2011 Workshop Chairs

It is our great pleasure to welcome you to the International Workshop on Adaptive Learning via Interactive, Collaborative and Emotional approaches (ALICE-2011), which will be held in conjunction with the 3rd IEEE International Conference on Intelligent Networking and Collaborative Systems (IEEE INCoS-2011) in Fukuoka Institute of Technology, Fukuoka, Japan, from November 30 to December 2, 2011.

The international workshop ALICE-2011 aims at providing a forum for innovative adaptive e-learning combining personalization, collaboration and simulation aspects within an affective/emotional based approach able to contribute to the overcoming of the quoted limitations of current e-learning systems and content. Special emphasis is given to environments that are interactive, challenging and context aware while enabling learners' demand of empowerment, social identity, and authentic learning experience.

Over the last decade, despite a great potential and some initial successes, e-learning systems do not yet have the impact that many believe is possible. Moreover, the gap seems to be increasing because of the greater expectations of the current generation (Digital Natives) who have grown up with modern technology. There are also more general problems. In particular, an over-emphasis on cost effectiveness has meant that content is often not as strong as it needs to be and this deficiency has contributed to a lack of user engagement and some high attrition rates. We accepted 12 high quality submissions in ALICE-2011 workshop, which addressed these issues and have consistently highlighted the important relationship between engagement and learning, with students who are highly motivated being more likely to engage in the learning process.

ALICE-2011 international workshop is fully supported by the EU Project ALICE (<http://www.aliceproject.eu/>). Many people inside and outside the ALICE project contributed to the success of the first edition of this workshop. First, we would like to thank the organizing committee of IEEE INCoS-2011 International Conference for giving us the opportunity to organize ALICE-2011 as well as the Local Arrangement Chairs for the local arrangement of the workshop. We would like to thank all the authors of the workshop for submitting their research works and for their participation. We are looking forward to meeting them again in the forthcoming editions of the workshop.

We would like to express our appreciation to ALICE-2011 reviewers who carefully evaluated the submitted papers. We would also like to express our gratitude to Prof. Naomi Miyake for her great support to our workshop. Finally, we would like to thank the Editor-in-Chief of the Journal of Computer Assisted Learning for the consideration of publishing an extension of the best papers of the workshop in this prestigious journal.

We hope you will enjoy the workshop and have a great time in Fukuoka.

ALICE-2011 Workshop Chairs

Santi Caballé, Open University of Catalonia, Barcelona, Spain

Nicola Capuano, University of Salerno, Italy

Welcome Message from WKED-2011 International Workshop Organizers

It is our great pleasure to welcome you to the 1st International Workshop on Kansei Engineering and Design (WKED-2011), which will be held in conjunction with the 3rd IEEE International Conference on Intelligent Networking and Collaborative Systems (IEEE INCoS-2011) in Fukuoka Institute of Technology, Fukuoka, Japan, from November 30 to December 2, 2011.

Kansei Engineering and Design research has been expected to assist progress of societies with various research fields such as engineering, economics, and psychology. The Workshop on Kansei Engineering and Design aims at exploring ongoing efforts in the theory, design and application on a wide variety of research fields related to Kansei Engineering. The workshop provides an opportunity for academic/industry researchers and professionals to share, exchange, and review recent advances on Kansei Engineering research. Original contribution describing recent modeling, analysis, and experiment on Kansei Engineering and Design with particular, but not exclusive, regard to:

- Kansei Theory - Interaction Design
- Kansei Information - Experience Design
- Kansei Engineering - Fashion Design
- Kansei Robotics - Computing Design Cognition
- Kansei Education - Business
- Kansei and Music - Management
- Kansei Measurement - Brand Identity
- Emotion Measurement - Designing Pleasure
- Emotional Design - Culture and Design
- Psychology of Emotions

For the WKED-2011, we received very high originality submissions and we accepted 5 papers. We would like to thank all the authors of the workshop for submitting their research works. Also we would like to express our appreciation to WKED-2011 reviewers who carefully evaluated the submitted papers. We hope all contributors and participants will enjoy the workshop with research discussions, inspiration of new idea, meeting people, and have a great time in Fukuoka, Japan.

WKED-2011 International Workshop Organizing Committee

Hisao Shiizuka, Kogakuin University, President of JSKE, Japan

Kaori Yoshida, Kyushu Institute of Technology, Japan

IEEE INCOS-2011 Keynote I

Prof. Timothy K. Shih

Multimedia Information Network Lab, National Central University, Taiwan

E-mail: TimothyKShih@gmail.com

Video Forgery and Motion Editing

Abstract:

Video Forgery is a technique for generating fake video by altering, combining, or creating new video contents. We change the behavior of actors in a video. For instance, the outcome of a 100-meter race in the Olympic Game can be falsified. We track objects and segment motions using a modified mean shift mechanism. The resulting video layers can be played in different speeds and at different reference points with respect to the original video. In order to obtain a smooth movement of target objects, a motion interpolation mechanism is proposed based on reference stick figures (i.e., a structure of human skeleton) and video inpainting mechanism. The video inpainting mechanism is performed in a quasi-3D space via guided 3D patch matching. Interpolated target objects and background layers are fused. It is hard to tell whether a falsified video is the original.

In addition, in this talk, we demonstrate a new technique to allow users to change the dynamic texture used in a video background for special effect production. For instance, the dynamic texture of fire, smoke, water, cloud, and others can be edited through a series of automatic algorithms. Motion estimations of global and local textures are used. Video blending techniques are used in conjunction with a color balancing technique. The editing procedure will search for suitable patches in irregular shape blocks, to reproduce a realistic dynamic background, such as large waterfall, fire scene, or smoky background. The technique is suitable for making science fiction movies.

We demonstrate the original and the falsified videos in our website at <http://www.csie.ncu.edu.tw/~tshih>. Although video falsifying may create a moral problem, our intension is to create special effects in movie industry.

IEEE INCOS-2011 Keynote II

Prof. Yuji Oie

Vice President, Kyushu Institute of Technology, Japan

E-mail: oiie@cse.kyutech.ac.jp

Networks with Diversity and Their Technologies

Abstract:

The network plays a vital role in our society and is expected to evolve to meet the changing demands and constraints. The demands for the use of networks are diverse so that they are used by diverse applications and in diverse environments. In particular, the number of mobile users of the networks significantly increases, so that much more wireless frequency will be needed in near future. The wireless frequencies are diverse, in nature, in terms of their transmission capacity and coverage.

Almost all of them are already assigned to specific use and are not available except for predetermined use, while their utilization varies in time and can be sometime quite limited. In addition, mobile users can be in diverse environment: sometimes in challenged environment which can be featured by huge communication error or/and intermittent links. In this talk, I will focus on two networks: Dynamic Spectrum Access Network (DSAN) and Delay, Disruption, Disconnection Tolerant Network (DTN). The DSAN enables effective use of diverse frequency, while the assigned frequency is not always used efficiently yet.

We have conducted vehicle communications field tests in Japan using TV white space and I will show a video about the field tests. The DTN enables communication in challenged environments. Furthermore, performance metric used for network design becomes diverse; e.g., energy saving is now regarded as important one, which leads to green networking. Network topologies are also diverse; e.g., nodes are not always uniform, but some of them are linked with a great number of nodes, while others are not. These features and networking technologies will be addressed as well.

ALICE-2011 Keynote Talk

Prof. Naomi Miyake

CoREF, University of Tokyo, Tokyo, Japan

E-mail: nmiyake@p.u-tokyo.ac.jp

Knowledge Constructive Jigsaw as an Adaptive Learning Framework: Its Design Principles and Network Supports

Abstract:

I will report our current endeavor to create a learning community aiming for better quality education, by changing classroom practices from teacher-centric to learnercentric. Our efforts are focused on creating intellectually challenging collaborative learning based on a framework called “constructive interaction”, which has been identified as a basic skill of human beings to learn from social interaction. The design is called the “Knowledge Constructive Jigsaw”, which encourages the learners engage in actively explaining what each learner knows to integrate them and create an answer to the shared problem. In this presentation, I will explain the basic framework and how it can be implemented in regular classroom activities, with some outcomes. I will then touch upon how this renovation effort opens new research fields, including the formation of a networked, sustainable learning community.

*This keynote talk has been supported by the European Commission under the Collaborative Project ALICE (FP7-ICT-2009.4.2-257639)

MIST-2011 Keynote Talk

Prof. Dieter Gollman

Hamburg University of Technology, Germany

E-mail: diego@tu-harburg.de

From Insider Threats to Business Processes that are Secure-by-Design

Abstract:

The observations that security is not an add-on feature and that insiders pose a considerable security threat have both been familiar in the security community for a long time. Attempts to deal with insider threats are not new either. Relevant techniques such as separation of duties are part of the standard toolset of security practitioners. However, it may well be true that in the past most countermeasures against insider threats belonged to the social and not to the technical domain. With increasing automation and IT support for business processes this approach is reaching its limits, as are approaches that just add-on IT security to business processes. This talk will argue that defending against insider threats is in fact just one aspect of designing secure organisational (business) processes, and that one has to start at the design of the processes within an organization to make progress in dealing with insider threat.

IEEE INCOS-2011

*The Third IEEE International Conference on
Intelligent Networking and Collaborative Systems*

IEEE INCOS-2011 Main Conference & Workshops Program

Wednesday, November 30, 2011

08:00 – 09:00 Registration

09:00 – 10:30 Single Session: Opening & Keynote Talk

IEEE INCOS-2011 Keynote Talk I:

Video Forgery and Motion Editing

Prof. Timothy K. Shih, *National Central University, Taiwan*

10:30 – 11:00 Coffee Break

11:00 – 12:30 Parallel Sessions

INCOS-S1: Optimization and Fairness – Room 1

Chair: Hiroyoshi Miwa, *Kwansei Gakuin University, Japan*

1. Optimal Forwarding Criterion of Utility-based Routing Under Sequential Encounters for Delay Tolerant Networks

Akihiro Fujihara, Shiro Ono, Hiroyoshi Miwa

2. Proposal of an Evolutional Architecture for Metabolic Computing

Minoru Uehara

3. Fairness with Semi-rational Players in Standard Communication Networks

Yilei Wang, Qiuliang Xu

4. Diffusion in Social Networks and Market Stability

Nikos Salamanos, Dimitris Konstantopoulos

INCOS-S2: Evolutionary Computation and Meta-heuristics – Room 2

Chair: Mario Koeppen, *Kyushu Institute of Technology, Japan*

1. Comparative Evaluations of Evolutionary Computation with Elite Obtained in Reduced Dimensional Spaces

Yan Pei, Hideyuki Takagi

2. Genetically Evolved Fuzzy Predictor for Photovoltaic Power Output Estimation

Pavel Kromer, Vaclav Snasel, Jan Platos, Ajith Abraham, Lukas Prokop, Stanislav Misak

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3. Unsorting the Proportional Fairness Relation

Mario Koeppe, Kaori Yoshida, Masato Tsuru

4. Effects of Mutation and Crossover in Genetic Algorithms for Node Placement in WMNs Considering Number of Covered Users Parameter

Tetsuya Oda, Admir Barolli, Evjola Spaho, Fatos Xhafa, Leonard Barolli

W-CIDM-S1: Approaches and Methods for Intelligence in Disaster Management – Room 3

Chair: Fatos Xhafa, Technical University of Catalonia, Spain

1. Introduction of Acquiring Method for Agents Actions with Simple Ant Colony Optimization in RoboCup Rescue Simulation System

Hisayuki Sasaoka

2. A Bayesian Filter Approach to Modelling Human Movement Patterns for First Responders Within Indoor Locations

Eoghan Furey, Kevin Curran, Paul Mc Kevitt

3. A Collective Intelligence Resource Management Dynamic Approach for Disaster Management: A Density Survey of Disasters Occurrence

Eleana Asimakopoulou, Nik Bessis, Stelios Sotiriadis, Fatos Xhafa, Leonard Barolli

W-MNSA-S1: Wireless Networks – Room 4

Chair: Leonard Barolli, Fukuoka Institute of Technology, Japan

1. A Framework of AP Aggregation Using Virtualization for High Density WLANs

Takahiro Nagai, Hiroshi Shigeno

2. A Piecewise Packet Mapping Algorithm for Video Transmission Over 802.11e Wireless Networks

Wen-Ping Lai, Bo Li

3. Cognitive Wireless Network for Large Scale Disaster

Noriki Uchida, Kazuo Takahata, Yoshitaka Shibata

4. An Extension of Active Access-Point Selection Algorithm for Throughput Maximization in Wireless Mesh Networks

Nobuo Funabiki, Junki Shimizu, Toru Nakanishi, Kan Watanabe, Shigeru Tomisato

W-MNSA-S2: Antenna and Wave Propagation – Room 5

Chair: Hiroshi Maeda, Fukuoka Institute of Technology

1. Relationship Between Source Height and Distance Order of Propagation Along Random Rough Surface

Junichi Honda, Kazunori Uchida

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2. A Study on a Secure Wireless Link Creation Based on Multi-Path Routing Combined with Transmit Antenna Directivity Control

Masaaki Yamanaka, Norihiko Morinaga, Shinichi Miyamoto, Seiichi Sampei

3. Hexagonal Resonator in Two Dimensional Photonic Crystal Structure

Hiroshi Maeda, Hiroyuki Terashima, Yongmei Zhang, Takuya Shinohara

12:30 – 14:00 Lunch Break

14:00 – 15:30 Parallel Sessions

INCOS-S3: E-learning – Room 1

Chair: Santi Caballe, Open University of Catalonia, Spain

1. Linked Open Data for Learning Object Discovery: Adaptive e-Learning Systems

Burasakorn Yoosooka, Vilas Wuwongse

2. Endowing e-Learning Systems with Emotion Awareness

Michalis Feidakis, Thanasis Daradoumis, Santi Caballé

3. Can Games Based Learning Assists Teachers in Achieving the Aims of Curriculum to Bilingual Students of Different Ethnic Minorities?

Konstantinos Kalemis

4. Kindergarten Children as Story Makers. The Effect of the Digital Medium

Tharrenos Bratitsis, Triantafyllos Kotopoulos, Kyriaki Mandila

INCOS-S4: Security and Privacy – Room 2

Chair: Bo Qin, Universitat Rovira i Virgili, Spain

1. Strong Security Enabled Certificateless Aggregate Signatures Applicable to Mobile Computation

Hu Xiong, Qianhong Wu, Zhong Chen

2. Distributed Privacy-Preserving Secure Aggregation in Vehicular Communication

Bo Qin, Qianhong Wu, Josep Domingo-Ferrer, Willy Susilo

3. Linear Complexities of the Frequency Hopping Sequences in Two Optimal Sets

Juntao Gao, Xuelian Li

4. A Planes Detection Algorithm Based on Feature Distribution

LuGang Zhao, ChengKe Wu

W-CIDM-S2: Critical Reviews and Applications – Room 3

Chair: Fatos Xhafa, Technical University of Catalonia, Spain

1. Linked Data in Disaster Mitigation and Preparedness

Thushari Silva, Vilas Wuwongse, Hitesh Nidhi Sharma

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2. Rushing Attack in Mobile Ad Hoc Networks

Abdullah Alshahrani, Saad Alshahrani

3. Evaluation of Ad Hoc Networks in Disaster Scenarios

D. G. Reina, S. L. Toral, F. Barrero, N. Bessis, E. Asimakopoulou

4. An Event-based Approach to Supporting Team Coordination and Decision Making in Disaster Management Scenarios

Fatos Xhafa, Eleana Asimakopoulou, Nik Bessis, Leonard Barolli, Makoto Takizawa

W-MNSA-S3: Security and Trustworthiness – Room 4

Chair: Minoru Uehara, Toyo University, Japan

1. Using Diagonal and Horizontal Vertical Sobel Operators Spam Detection

Peng Wan, Minoru Uehara

2. A Fuzzy-based Trustworthiness System for JXTA-Overlay P2P Platform

Kohei Umezaki, Evjola Spaho, Yuichi Ogata, Leonard Barolli, Fatos Xhafa, Jiro Iwashige

3. Comparison Evaluation of Encryption Methods for a User Attestation System Using a Cellular Phone

Noriyasu Yamamoto, Toshihiko Wakahara

4. Steganographic Algorithm Injection in Image Information Systems Used in Healthcare Organizations

Edlira Martiri, Artur Baxhaku, Ezmolda Barolli

W-MNSA-S4: Wireless Communication – Room 5

Chair: Sang-Soo Yeo, Mokwon University, Republic of Korea

1. Electric Field Intensity Computed by DRTM in Relation to the Number of Plate Observation Points and Frequency

Masafumi Takematsu, Junichi Honda, Kazunori Uchida

2. Doppler Shifted Scattering from a Target Moving Along Inhomogeneous Random Rough Surface

Shunsuke Nakashima, Junichi Honda, Kazunori Uchida

3. Dispersive Video Frame Importance Driven Probabilistic Packet Mapping for 802.11e Based Video Transmission

Wen-Ping Lai, En-Cheng Liou, Wei-Hao Fu

4. Application of Horner Method to Approximate Fresnel Function

Yuki Kimura, Junichi Honda, Kazunori Uchida

15:30 – 16:00 Coffee Break

16:00 – 17:30 Parallel Sessions

INCOS-S5: Sensor Networks – Room 1

Chair: Akio Koyama, Yamagata University, Japan

1. R-MAC: A MAC Protocol for Power Reduction in Wireless Sensor Networks Based on Load Estimation and Its Performance Evaluation
Akio Koyama, Ryoma Watanabe, Leonard Barolli, Makoto Takizawa
2. Analysis of Field Distribution and Density of Sensor Node
Junichi Honda, Kazunori Uchida
3. A Fuzzy-based Cluster-Head Selection System for WSNs Considering Sensor Node Movement
Hironori Ando, Qi Wang, Leonard Barolli, Elis Kulla, Arjan Durrresi, Fatos Xhafa
4. A Routing Protocol based on Power-Controlled Sleep Scheduling for Wireless Sensor Networks
Ying-Hong Wang, Yu-Chu Lin, Cheng-Hung Tsai

INCOS-S6: Cloud and Grid Computing – Room 2

Chair: Fatos Xhafa, Technical University of Catalonia, Spain

1. Context Parsing, Processing and Distribution in Clouds
Saad Liaquat Kiani, Ashiq Anjum, Nik Bessis, Richard Hill, Michael Knappmeyer
2. Modeling Requirements for Enabling Meta-Scheduling in Inter-Clouds and Inter-Enterprises
Nik Bessis, Stelios Sotiriadis, Valentin Cristea, Florin Pop
3. A Study on Operation of Photovoltaic Grid System Using Weather Forecast
Kenichi Fujii, Motoi Yamagiwa, Minoru Uehara
4. On Exploitation vs Exploration of Solution Space for Grid Scheduling
Fatos Xhafa, Bernat Duran, Joanna Kolodziej, Leonard Barolli, Makoto Takizawa

W-CIDM-S3: Network Applications for Disaster Management – Room 3

Chair: Kazunori Uchida, Fukuoka Institute of Technology, Japan

1. Allocation of Base Stations by Using PSO Method
Jun-Hyuck Lee, Junichi Honda, Kazunori Uchida
2. Performance Evaluation of MANET Testbed in a Mixed Indoor and Outdoor Environment
Masahiro Hiyama, Elis Kulla, Makoto Ikeda, Leonard Barolli, Jiro Iwashige
3. Performance Evaluation of a Fuzzy-based Integrated CAC and Handover System for Cellular Networks
Leonard Barolli, Gjergji Mino, Elis Kulla, Akio Koyama, Jiro Iwashige

W-MNSA-S5: Authentication Systems – Room 4

Chair: Kenzi Watanabe, Wakayama University, Japan

1. A Seamless Connection for Authentication Required Web Sites by Shibboleth
Kenzi Watanabe, Makoto Otani

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2. A New One-time Authentication System Using a Cellular Phone with FeliCa Chip

Yusuke Kowakame, Toshihiko Wakahara

3. A Fair Exchange Protocol for Attribute Certification

Yuji Suga

4. Detection and Prohibition of NAPT for Network User Authentication System “Opengate”

Mitsuhiro Suenaga, Makoto Otani, Kenzi Watanabe

W-MNSA-S6: E-learning Systems and Applications – Room 5

Chair: Hiroaki Nishino, Oita University, Japan

1. The Best Learning Order Inference Based on Blue-Red Trees of Rule-Space Model for Social Network-Case in ITE Course

Yung-Hui Chen, Lawrence Y. Deng, Ku-Chen Huang

2. Micro E-Board: An Interactive Teaching Aid Using Mobile Devices

Hiroaki Nishino, Shota Hidaka, Tsuneo Kagawa, Kouichi Utsumiya

3. A Support System Using Moodle for Improving Students Understanding

Wei-Yong Zhao, Toshihiko Wakahara

19:00 – 21:00 Welcome Reception Party

Thursday, December 1, 2011

09:00 – 10:30 Single Session

IEEE INCOS-2011 Keynote Talk II:

Networks with Diversity and Their Technologies

Prof. Yuji Oie, Kyushu Institute of Technology, Japan

10:30 – 11:00 Coffee Break

11:00 – 12:30 Parallel Sessions

INCOS-S7: Wireless Mesh and Sensor Networks – Room 1

Chair: Sang-Soo Yeo, Mokwon University, Republic of Korea

1. A Study on the Performance of Wireless Localization System Based on AoA in WSN Environment
Yang Sun Lee, Ji-Min Lee, Sang Soo Yeo, Jong Hyuk Park, Leonard Barolli
2. A Tabu Search Algorithm for Efficient Node Placement in Wireless Mesh Networks
Fatos Xhafa, Christian Sanchez, Admir Barolli, Makoto Takizawa
3. Comparison Evaluation of Static and Mobile Sensor Nodes in Wireless Sensor Networks Considering Packet-loss and Delay Metrics
Tao Yang, Leonard Barolli, Jiro Iwashige, Arjan Durrezi, Fatos Xhafa
4. MS2HM: A Multimedia Service Session Handoff Method between Heterogeneous Wireless Networks
Yulong Shen, Zhiwei Zhang, Jianfeng Ma, Qingqi Pei, Qijian Xu, Hao Yin

W-MNSA-S7: Performance Evaluation – Room 2

Chair: Tomoya Enokido, Risho Univeristy, Japan

1. The Evaluation of Time Transferred, CPU Consumption and Memory Utilization in XEN-PV, XEN-HVM, OpenVZ, KVM-FV and KVM-PV Hypervisors by Using FTP and HTTP Approaches
Igli Tafa, Ermal Beqiri, Hakik Paci, Elinda Kajo, Aleksander Xhuvani
2. Performance of a Stable Unit Active Queue Management
Fumihiko Nakamura, Takuo Nakashima
3. Design and Implementation of 3D MeshRAID in Virtual Large-Scale Disks
Minoru Uehara
4. Evaluation of the Improved EPCLB Algorithm for Distributed Applications
Tomoya Enokido, Makoto Takizawa

W-WIND-S1: Network Design Method – Room 3

Chair: Hiroshi Koide, Kyushu Institute of Technology, Japan

1. Approximation Algorithm for Finding Protected Links to Keep Small Diameter Against Link Failures
Koji Imagawa, Takeshi Fujimura, Hiroyoshi Miwa
2. Network Design Method by Link Protection for Network Load Alleviation Against Failures
Akira Noguchi, Takeshi Fujimura, Hiroyoshi Miwa
3. A Generic Approach to Multi-Fairness and Its Application to Wireless Channel Allocation
Mario Koeppen, Kaori Yoshida, Masato Tsuru
4. MVA Modeling of Multi-core Server Distributed Systems
Yuki Nakamizo, Hiroshi Koide, Kazumi Yoshinaga, Dirceu Cavendish, Yuji Oie

W-MIST-S1: Keynote and Invited Paper – Room 4

Chair: Ilsun You, Korean Bible University, Republic of Korea

1. **Keynote Talk:** From Insider Threats to Business Processes that are Secure-by-Design
Dieter Gollmann
2. **Invited Industrial Paper:** On Data Importance Analysis
Shinsaku Kiyomoto, Yutaka Miyake

W-ALICE-S1: E-learning Systems – Room 5

Chair: Santi Caballe, Open University of Catalonia, Spain

1. **Keynote Talk:** Knowledge Constructive Jigsaw as an Adaptive Learning Framework: Its Design Principles and Network Supports
Naomi Miyake
2. An Ontology-based System for Context-aware e-Learning
Nicola Capuano, Matteo Gaeta, Saverio Salerno, Guseppina Rita Mangione
3. An Integrated Model for e-Assessment of Learning Experiences Enriched with Complex Learning Resources
Mohammad Al-Smadi, Margit Hoefler, Christian Guetl

12:30 – 14:00 Lunch Break

14:00 – 15:30 Parallel Sessions

INCOS-S8: Parallel and Distributed Architectures – Room 1

Chair: Sang Oh Park, Chung-Ang University, Republic of Korea

1. An Alternative Implementation of 3FT RAID in Virtual Large Scale Disks
Minoru Uehara

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2. An OpenMP Compiler for Hybrid CPU/GPU Computing Architecture

Hung-Fu Li, Tyng-Yeu Liang, Jhen-Lin Jiang

3. Energy Efficient Distributed Systems for Storage Servers

Takuro Inoue, Ailixier Aikebaier, Tomoya Enokido, Makoto Takizawa

4. Fast Parallel Computation of Tate Pairing

Zhitu Su, Chunhui Sun, Hui Li, Jianfeng Ma, Kai Fan

W-MNSA-S8: Cloud Computing – Room 2

Chair: Jason C. Hung, Overseas Chinese University, Taiwan

1. A Smart-Travel System Based on Social Network Service for Cloud Environment

Jason C. Hung, Victoria Hsu, Yu-Bing Wang

2. Evaluation of Bottlenecks in an Educational Cloud Environment

Shinichi Kibe, Minoru Uehara, Motoi Yamagiwa

W-WIND-S2: Network Architecture and Performance – Room 3

Chair: Akira Nagata, Network Application Engineering Laboratories Ltd., Japan

1. Store-carry-forward Based Networking Infrastructure: Vision and Potential

Shinya Yamamura, Akira Nagata, Tsuru Masato

2. Development of IPv6/IPv4 Translator Using High Performance Packet Processing Engine

Ryo Sasaki, Makoto Otani, Kenzi Watanabe

3. Influence of Interference with Moving Terminal in Wireless LAN Environment and Evaluation of Behavior of QoS-TCP

Remi Ando, Tutomu Murase, Masato Oguchi

4. Selecting Measurement Paths for Efficient Network Monitoring and Diagnosis Under Operational Constraints

Atsuo Tachibana, Shigehiro Ano, Masato Tsuru

5. Protocol Enhancement for Near Field Communication (NFC), Future Direction and Cross-Layer Approach

Hiroshi Sakai, Akira Arutaki

W-MIST-S2: Managing Insider Threat – Room 4

Chair: Ilsun You, Korean Bible University, Republic of Korea

1. Insider Threats are Getting Worse Within Industries: Isolated Secondary Backup Required

Kwangjin Bae, Sungjin Kim, Yongoo Lee, Ilsun You, Kangbin Yim, Taeho Son

2. Towards Countermeasure of Insider Threat in Network Security

Yoshiaki Hori, Takashi Nishide, Kouichi Sakurai

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3. Towards Detecting Suspicious Insiders by Triggering Digital Data Sealing

Takayuki Sasaki

4. A Mechanism on Risk Analysis of Information Security with Dynamic Assessment

Chien-Ting Kuo, He-Ming Ruan, Chin-Laung Lei, Shih-Jen Chen

W-ALICE-S2: Adaptive Learning and Collaborative Systems – Room 5

Chair: Jose Mangione, University of Salerno, Italy

1. The Evaluation of ReCoNote Summaries for Learner-Centered Integration

Sayaka Tohyama, Naomi Miyake

2. A Framework for Dealing with Knowledge About On-line Collaborative Learning Sessions

Jordi Conesa, Santi Caballé, David Ganan, Josep Prieto

3. CC-LO: a New Type of Learning Object for the Virtualization of Live Collaborative Sessions

Santi Caballé, Néstor Mora, Ian Dunwell, David Gañán

4. Interoperability Scenarios to Measure Informal Learning Carried Out in PLEs

Miguel Conde, Francisco García-Penalvo, Marc Alier

5. Emotion Measurement in Intelligent Tutoring Systems: What, When and How to Measure

Michael Feidakis, Thanasis Daradoumis, Santi Caballé

15:30 – 16:00 Coffee Break

16:00 – 17:30 Poster Session & Parallel Sessions

Poster Session – “Coffee Break” Room

Chair: Masato Tsuru, Kyushu Institute of Technology, Japan

1. Design and Implementation of a Dynamic Reconfigurable Classroom for Cooperative Learning

Hideki Kondo, Hiroyuki Narahara

2. Study on Energy-efficient Routing Protocol based on Experimental Evaluation

Satoru Akimoto, Hitomi Tamura, Kenji Kawahara, Yoshiaki Hori

3. A New Generation Network Architecture to Accommodate Virtual Network Application Services

Hiroaki Yamanaka, Masayoshi Shimamura, Shuji Ishii, Eiji Kawai, Katsuyoshi Iida, Tsuru Masato

4. Heuristic Information Retrieval Using Variable Identifiers in Mobile Ad-hoc Networks

Kazuki Kume, Kei Ohnishi, Kazuya Tsukamoto, Shinya Yamamura, Akira Nagata

5. Q-learning Based p-persistent CSMA MAC Protocol for Secondary User of Cognitive Radio Networks

Sarena Bao, Takeo Fujii

6. Performance Evaluation of Power Saving Scheme for Wireless LAN with Station Aggregation

Daiki Nobayashi, Yutaka Fukuda, Takeshi Ikenaga, Kazumi Kumazoe, Tetsuya Ito

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7. P2P-based Contents Distribution Method Using Network Coordinates System
Hiroshi Yamamoto, Katsuyuki Yamazaki
 8. An Information Search Method Based on Management Area Segmentation with Multiple Mobile Agents in Unstructured Peer-to-Peer Networks
Takayuki Yamamoto, Shinji Sugawara, Yutaka Ishibashi
 9. Efficient Contents Sharing Using Differences between Versions in Peer-to-Peer Networks
Toshinobu Hayashi, Shinji Sugawara, Yutaka Ishibashi
 10. Implementation of Activity Recognition From Accelerometers on Mobile Phones
Go Hirakawa, Thin Thin Nwe, Yuichi Hattori, Sozo Inoue
 11. Low-Latency Normalization Method for Multi-User MIMO System Using Vector Perturbation Precoder
Shogo Fujita, Leonardo Lanante Jr., Yuhei Nagao, Masayuki Kurosaki, Hiroshi Ochi

W-MIST-S3: Related Technologies 1 – Room 4

Chair: Shinsaku Kiyomoto, KDDI R&D Lab., Japan

1. A Forensic Analysis of Images on Online Social Networks
Aniello Castiglione, Giuseppe Cattaneo, Alfredo De Santis
2. On the Construction of a False Digital Alibi on the Android OS
Pietro Albano, Aniello Castiglione, Giuseppe Cattaneo, Giancarlo De Maio, Alfredo De Santis
3. Development of Network User Authentication Gateway System Using “High Performance Packet Processing Engine”
Yuki Wakamizu, Makoto Otani, Kenzi Watanabe
4. KVM-based Detection of Rootkit Attacks
Xingjun Zhang, Endong Wang, Long Xin, Zhongyuan Wu, Weiqing Dong, Xiaoshe Dong

W-ALICE-S3: E-learning Applications and Algorithms – Room 5

Chair: Santi Caballe, Open University of Catalonia, Spain

1. Blended Game-Based Learning Environments: Extending a Serious Game Into a Learning Content Management System
Ian Dunwell, Panagiotis Petridis, Sylvester Arnab, Aristidis Protopsaltis, Maurice Hendrix, Sara de Freitas
2. A New Model for Storytelling Complex Learning Objects
Giuseppina Rita Mangione, Francesco Orciuoli, Anna Pierri, Pierluigi Ritrovato, Marcello Rosciano
3. Exploring Fish School Algorithm for Improving Turnaround Time: An Experience of Content Retrieval
Soumya Banerjee, Santi Caballé

-
4. Exploring Learning Pattern in Social Network

Soumya Banerjee, Santi Caballé

5. Ethnic Immigrant Minorities and Mobile Learning for Schools - A Class Without Walls, A New Didactic Approach to Digital Literacy Across the Curriculum

Konstantinos Kalemis

19:00-21:00 Conference Banquet

Friday, December 2, 2011

09:00 – 10:30 Parallel Sessions

INCOS-S9: Collaborative and Intelligent Systems – Room 1

Chair: Jordi Conesa, *Open University of Catalonia, Spain*

1. Challenges in Automating Collaborative Negotiations
Raiye Hailu, Takayuki Ito
2. Knowledge Reuse: Its Role and Implications for Upper Level Ontologies
Jordi Conesa, Veda C. Storey, Vijayan Sugumaran, Santi Caballé
3. Generation of Offensive Strategies in Robot Soccer Game
Jie Wu, Vaclav Svaton, Jan Martinovic, Eliska Ochodkova, Vaclav Snašel
4. An Exploratory Social Network Analysis of Academic Research Networks
Sergio Toral, Nik Bessis, M.R. Martinez-Torres, Florian Franc, Federico Barrero, Fatos Xhafa

INCOS-S10: Authentication and Signatures – Room 2

Chair: Leonard Barolli, *Fukuoka Institute of Technology, Japan*

1. Homomorphic Linear Authentication Schemes for Proofs of Retrievability
Shengli Liu, Kefei Chen
2. Forward Secure Proxy Blind Signature Scheme
Kai Fan, Yue Wang, Hui Li
3. A New Strong Multiple Designated Verifiers Signature for Broadcast Propagation
Haibo Tian
4. Abuse-freeness Electronic Payment Protocol
Kai Fan, Yue Wang, Hui Li

W-MNSA-S9: P2P Networks – Room 3

Chair: Makoto Takizawa, *Seikei University, Japan*

1. A Fuzzy-based System for Data Replication in P2P Networks
Evjola Spaho, Leonard Barolli, Fatos Xhafa, Jiro Iwashige, Akio Koyama
2. Multimedia Quorum-based (MQB) Protocol in P2P Networks
Tadateru Ohkawara, Ailixier Aikebaier, Tomoya Enokido, Makoto Takizawa
3. Performance Evaluation of SmartBox End-Device for Medical Applications Using JXTA-Overlay P2P System
Yuichi Ogata, Kohei Umezaki, Evjola Spaho, Keita Matsuo, Leonard Barolli, Jiro Iwashige

-
4. Trustworthy Group Based Agreement Protocol in Scalable Distributed Networks

Ailixier Aikebaier, Tomoya Enokido, Makoto Takizawa

W-MNSA-S10: Multimedia Systems – Room 4

Chair: Hiroaki Nishino, Oita University, Japan

1. Development of Medical Imaging Diagnosis Support System with Sound Effects

Tsuneo Kagawa, Hideki Kudo, Shuichi Tanoue, Hiro Kiyosue, Hiromu Mori, Hiroaki Nishino, Kouichi Utsumiya

2. A Seminar Record Editing Algorithm

Natthapong Udomkarn, Toshihiko Wakahara

3. An Efficiency of Optimization Method of Sign Sound Using Interactive Differential Evolution

Makoto Fukumoto, Shintaro Ogawa

4. Measurement of Reading Characteristics of Multiplexed Image in QR Code

Damri Samretwit, Toshihiko Wakahara

W-MIST-S4: Cryptographic Technologies for Managing Insider Threats – Room 5

Chair: Yoshiaki Hori, Kyushu University, Japan

1. Security of Offline Anonymous Electronic Cash Systems Against Insider Attacks by Untrusted Authorities Revisited

Takashi Nishide, Kouichi Sakurai

2. Certificateless Ordered Sequential Aggregate Signature Scheme

Naoto Yanai, Raylin Tso, Masahiro Mambo, Eiji Okamoto

3. Image Based Crypto-Biometrics Key Generation

Marek R. Ogiela, Lidia Ogiela

4. Multi-Authority Attribute-based Signature

Dan Cao, Baokang Zhao, Xiaofeng Wang, Jinshu Su

10:30 – 11:00 Coffee Break

11:00 – 12:30 Parallel Sessions

INCOS-S11: Ad-hoc Networks – Room 1

Chair: Tetsuya Shigeyasu, University of Hiroshima, Japan

1. Comparison of Experimental Results of a MANET Testbed in Different Environments Considering BATMAN Protocol

Elis Kulla, Masahiro Hiyama, Makoto Ikeda, Leonard Barolli

2. Investigation Into BATMAN-adv Protocol Performance in an Indoor Mesh Potato Testbed

Edmundo Chissungu, Edwin Blake, Hanh Le

-
3. Mobile Ad-hoc Network Routing Protocols Performance Evaluation Using NS-3 Simulator

Makoto Ikeda, Masahiro Hiyama, Elis Kulla, Leonard Barolli

4. A New Slot Assignment Method for Slotted CSMA Based on Maximum Clique Extraction

Tetsuya Shigeyasu, Xiong Liu, Hiroshi Matsuno

INCOS-S12: Network Protocols, Algorithms and Search – Room 2

Chair: Mario Koeppen, *Kyushu Institute of Technology, Japan*

1. Node Degree-Aware Link Cost for Traffic Load-Distribution in Large-Scale Networks

Hitomi Tamura, Mario Koeppen, Masato Uchida, Masato Tsuru, Yuji Oie

2. A perfSONAR-based Integrated Multi-domain Network Measurement Platform - Internet Monitoring as a Service -

Katsuichi Nakamura, Masato Tsuru, Yuji Oie

3. Exploring Web Search Behavior Patterns to Personalize the Search Results

Walisa Romsaiyud, Wichian Premchaiswadi

4. HGRP: Hybrid Grid Routing Protocol for Heterogeneous Hierarchical Wireless Networks

Yulong Shen, Qingqi Pei, Ning Xi, Jianfeng Ma, Qijian Xu, Hao Yin

W-MNSA-S11: Multimedia Tools Techniques – Room 3

Chair: Hiroyuki Fujioka, *Fukuoka Institute of Technology, Japan*

1. A New Research Support System

Toshihiko Wakahara, Noriyasu Yamamoto, Natthapong Udomkarn, Damri Samretwit, Wei Yong Zhao

2. Reshaping and Reconstructing Handwritten Character Typeface Using Dynamic Font Model

Hiroyuki Fujioka, Shinya Miyata

3. Performance Evaluation of User Interfaces According to User Computer Skill and Computer Specifications

Shinichi Inenaga, Kaoru Sugita, Tetsushi Oka, Masao Yokota

4. A Graph Theoretic Algorithm for Recovering Drawing Order of Multi-Stroke Handwritten Images

Takayuki Nagoya, Hiroyuki Fujioka

5. FOAF-Academic Ontology: a Vocabulary for the Academic Community

Edlira Kalemi, Edlira Martiri

W-WKED-S1: International Workshop on Kansei Engineering and Design – Room 3

Chair: Kaori Yoshida, *Kyushu Institute of Technology, Japan*

1. Recommendation System Based on Competing Algorithms

E. Mazandarani, K. Yoshida, M. Koeppen, W. Bodrow

-
2. Color Effect on Subjective Perception of Progress Bar Speed
Kentaro Hamada, Kaori Yoshida, Kei Ohnishi, Mario Koeppen
 3. A Study on Information Recommendation Systems for Continuous Use
Hiroko Shoji, Hiroo Inamura, Akihiro Ogino
 4. Measurement and Classification of the Affective Value of Drum Rhythm Patterns
Yuta Kurotaki, Hisao Shiizuka
 5. Kansei/Affective Decision Making
Hisao Shiizuka, Ayako Hashizume

W-MIST-S5: Related Technologies 2 – Room 4

Chair: Kangbin Yim, Soonchunhyang University, Republic of Korea

1. Characterizing and Classifying Card-Sharing Traffic Through Wavelet Analysis
Aniello Castiglione, Alfredo De Santis, Francesco Palmieri
2. The AVQ Algorithm: Watermarking and Compression Performances
Raffaele Pizzolante, Bruno Carpentieri, Aniello Castiglione, Giancarlo De Maio
3. A Scalable Fault Management Architecture for ccNUMA Server
Yan Yang, Xingjun Zhang, Endong Wang, Nan Wu, Xiaoshe Dong
4. Software-based Detecting and Recovering from ECC-Memory Faults
Xingjun Zhang, Endong Wang, Dong Zhang, Yu Wang, Weiguo Wu, Xiaoshe Dong
5. Characterizing Time-Varying Behavior and Predictability of Cache AVF
Yu Cheng, Yongwen Wang, Zuocheng Xing, Minxuan Zhang

12:30 – 14:00 Lunch Break

Additional Information

Travel to Conference Venue

Access to Fukuoka Institute of Technology

FIT is located very close to “Fukkodai-Mae” station (the Station in the front of FIT) of JR (Japan Railways) Kagoshima Line. It takes about 3 minutes on foot from the train station to the main building of the university.

- From **JR Hakata Station**

Take JR train from Hakata Station (Kagoshima Line) to “Fukkodai-Mae” station. Both the local (stop at each station) and the rapid (skip some stations) trains stop at “Fukkodai-Mae” station. The local trains operate every 20 minutes and it takes about 20 minutes from Hakata station to “Fukkodai-Mae” station. The rapid trains operate every 25 minutes and it takes about 15 minutes from Hakata station to “Fukkodai-Mae” station. The ticket price is 270 yen and there is no difference in the ticket price between the local and rapid trains.

- From **Fukuoka International Airport**

Take the subway to “Hakata” station. Then transfer to “JR Kagoshima Line” and take the train for “FukkodaiMae” station. “Fukuokakuko (Airport)” subway station is located immediately below the domestic terminal. The subway fare to Hakata is 250 yen and it takes about 6 minutes. All trains from Fukuoka Airport go to Hakata. From the international terminal, there is a local bus service to Hakata Station (look for “Hakata” on the front of buses), which costs 190 yen. The other alternatives are the free shuttle buses to the domestic terminal where you can transfer to the subway, or you can take a taxi directly from the international terminal building.

- From **Hakata Harbor (Sea-Port) International Terminal**

It takes about 10 to 15 minutes to go from Hakata Harbour International Passenger Terminal to “Hakata” station or Tenjin station. The bus numbers 11 and 19 go to Hakata and bus numbers 55, 151, 152 and 209 go to Tenjin. The nearest subway station is “Gofukumachi” and it takes about 15 minutes on foot from the terminal. The other alternative is to take a taxi.

- From Tenjin or Nakasu-Kawabata (**Downtown**) Area

Take the subway to “Hakata” station. Then transfer to “JR Kagoshima Line” and take the train for “FukkodaiMae” station.

Taxi Information

A large number of taxis operate 24 hours and can be found in many streets in the city. Outside stations and in other places with heavy pedestrian traffic, there are also taxi stands. An empty taxi can be spotted by a red sign behind the windscreen and to the driver's left side, or at night when the rooftop sign is illuminated. Most of the taxis are “ko-gata” (small), but there are also “chu-gata” (medium size) and “o-gata” (large) size taxis, which are more expensive. The fare for a ko-gata taxi is 550 yen up to 1.2 km and for each additional 200 meters is increased 50 yen. Between 11:00 p.m. and 5:00 a.m., the fares are increased by 20%. It is not customary to tip the driver at the end of your journey. The followings are the expected fare of “ko-gata” taxi: from Fukuoka International Airport to FIT 5,000 yen; from Fukuoka International Airport to Hakata Station 1,350 yen; and from Hakata Harbor to FIT 4,500 yen.

Social Events

Reception Party

November 30th, 2011 **19:00 - 21:00**

OASIS Restaurant

Fukuoka Institute of Technology (FIT)

3-30-1 Wajiro-Higashi, Higashi-Ku,

Fukuoka 811-0295

Tel.: 092-606-2204

Banquet Party

December 1st, 2011 **19:00 - 21:00**

Hakata Centraza Hotel

4-23, Chuogai, Hakataeki, Hakata-ku, Fukuoka-shi,

Fukuoka 812-0012

Tel: +81-92-461-0111

Internet Access

During the Conference days there will be wireless connection around university campus.

SSID: incosatfit

Key: kincos2011fit

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Kindergarten Children as Story Makers: The Effect of the Digital Medium

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Abstract—Fairy Tales exist for centuries and have intrigued educators who have been utilizing their “magical power of affection”, especially when teaching young children. In the current paper, story creation is examined with the perspective of the children as authors. A web 2.0 service, Tikatok, which provides several facilities for creating stories in a book-like format, is utilized in order to examine the effect of the digital medium (ICTs) in the story creation process by the children. Eight Kindergarten students divided into four pairs, worked in different settings. The results show an impressive effect of the computer on children’s motivation, as well as several qualitative aspects of story creation.

Keywords - Story telling, Web 2.0, Kindergarten

I. INTRODUCTION

Fairy Tales are the cultural heritage of every nation. All cultures through time have their own, oral or written, tales to show. Initially fairy tales were addressed to adults for amusement or relieving purposes. Over time, tales have evolved to become products of famous writers, as well as an ordinance for children whose educational value has also been accounted for. Fairy tales are being successfully used by teachers as an educational tool for many years, mostly in Preschool and early Primary Education.

Especially for creating a fairy tale, several methods can be used for assisting children create their own stories. Apart from the traditional methods, technology provides opportunities and tools to the educators in order to experiment with innovative methods of story creation, such as digital narration. The latter is the combination of traditional, oral narration and interactive, multimedia technologies. Several digital narration tools are available nowadays, addressed to young children. The current paper studies the creation of stories by children through digital tools, in comparison with the traditional method.

Specifically, the core aim of the presented study is the examination of the possible differentiation in story creation by preschool students, due to the use of digital story making software (the Tikatok online service is used). Also the study aims at researching whether the provision of a predefined book-like structure, which is provided by Tikatok, facilitates story making by young students.

The paper is structured as follows; initially the theoretical background is presented, focusing on fairy tales utilization and digital story telling. Then the methodology is explained and the research questions are formulated. Finally the results

of the conducted experiment are presented, before the concluding discussion.

II. THEORETICAL BACKGROUND

Fairy tales are being told as long as human beings exist on earth. Every nation and culture has produced its own tales, oral or written. Of course, over the time new elements are being added in older tales and stories or the existing ones are being updated, based on the current era and social status, each time. As a literary type, tales are characterized by their universality and the facilitation of otherness adoption, so as to allow the evolvement of local, cultural diversities [1].

When trying to determine what fairy tale is, several approaches can be found in the literature. According to Loukatos [2], “*fairy tale is a folkloric narration resembling an adventurous myth or one that has be composed by several myths, which are known to many people*”. Botle & Polivka, commentators of the Grimm Brothers’ tales, state that fairy tale is a narration created with poetic imagination, influenced by the world of magic and unaffected by laws of real life, which is pleasantly heard by children and adults, even if they do not believe its content [3]. On the other hand, Thompson [4] describes tales as formatted narrations with consequent patterns or episodes.

In fact, tales existed in ancient times. According to Delonis [5], “*it is impossible to imagine a mother not telling bedtime stories to her child in order to soothe his/her fears and anxieties*”. Initially fairy tales were addressed to adults for their amusement. Later in time, tales were also addressed to children and evolved to become a capitulary for them. Nowadays, tales fall mainly under two categories: *folkloric* and *modern* [6]. Nevertheless, all tales have common, fundamental elements. For starters, every tale is a narration, always objective and personal, although the narrator is usually detached from the actual story, allowing several variations of the basic narrative structure [6]. Also, tales regard a world of fantasy, where the laws of nature do not apply and miracles happen. Tales occur “once upon a time” or “once at a far away land”, including heroes with symbolic names, based on their characteristics (e.g. clothing, appearance, habitual, etc) [1].

Overall, fairy tales usually intrigued children, capture their attention and allow them to project themselves to imaginary places and upon imaginary heroes [6]. For that matter, fairy tales are the most significant constituent of children’s literature, even during the digital age we live in.

Children's imagination is quite vivid and they like to identify with tale heroes, mainly talking animals or other imaginary creatures who share the same needs, wishes and abilities with the children. The world of the fairy tales allows children to understand and face the real world [7]. Through fairy tales symbolic imagination is evolved. That is, children approach the real world by projecting symbolic figures from the imaginative world, thus gaining social thinking and increasing their self respect [8].

Psychologists and Educators have debated over tales, through the literature. From the time of Plato or when the Grimm Brothers appeared, adverse criticism was brought in tales regarding the element of ferocity [9]. Nevertheless, Maria Montessori recommends the use of fairy tales, omitting frightening and magical elements, for teaching children under 7 years old, due to the fact that they still find it difficult to distinguish real from imaginative life [9]. Tales can be used to teach children while amusing them, allowing them to think and develop cognitive and social dexterities, as well as initiatives. Specifically, the pedagogical and educative value of fairy tales consists in several constituents, provided that they [10]:

- cultivate native language through re-narration and dramatization.
- intrigue imagination and develop creativity, expand thinking and utilize children potential.
- cultivate and exercise memory.
- motivate symbolisms and meaning making.
- familiarize children with several art forms.
- exercise children in "reading the images" or "reading between the images", cultivating bookworming of the images.
- cultivate collaboration and enhance critical and creative thinking of children.
- contribute to the full scale psychokinetic, cognitive, perceptive and emotional development of children.

A. Children as Writers

Writing a story (or a book, an article, etc) is not always easy. For one to be a successful writer, he/she needs to know *to whom* the manuscript is addressed, *for what reason* is the manuscript written and *what does the writer want to talk about*. A good story needs a main character, regardless if that character is human or not, time and space of existence, involvement and a concrete end. The writer has to be familiar with these elements in order to utilize and manage them accordingly [11]. Apart from all the aforementioned elements, several writing techniques exist, in order to achieve the desired result.

When the writer is a child, some issues are examined differently. Children need something to trigger their interest and motivate them to create their own stories. For that matter, Gianni Rodari in his book "*Grammatica della fantasia: Introduzione all'arte di inventare storie*" refers to ways of facilitating story fabrication by children [12]. The simplest a specific word or a couple of non relevant ones with an approach, strange enough to trigger the children's imagination, thus leading to the formulation of an imaginary

relation set between these words. According to Rodari, this is a very effective approach which can be improved by exercising [12]. Another approach is the use of hypothetical questions; "*what would happen if...*". Furthermore, deliberate distortion of words can transform them into productive initiation points of a story. Also a very popular method for triggering children to create stories is that of altering the content of existing, well known stories or by simply adding an "*afterwards*" part to them. In the latter case, children can be asked to continue the story after its "formal" end, with the advantage that they already know the characters that take participate in it, as well as they behavior norms.

Specifically in Kindergarten, several methods can be applied for facilitating fairy tales' creation by children [7]:

- *Creating a story with images*: Children can use old, torn books/ tales they might have in order to create their own fairy tales. After cutting out images, they can attach them to big, folded cardboards, thus creating a "book". This kind of activity also facilitates assortment, memory and observation. The images may follow a timely and/or logical sequence. Scrambling the images can create a new story. Then, the teacher can assist the children by adding text to the images, dictated by them.
- *Improvisation*: As Dewey states, "in order to teach someone to think, one has to teach him/her to fabricate". Thus, in Kindergarten children should be induced to improvise in story making, by receiving several stimulants. The latter can be images, photographs or a question and answer game. The improvisations could be recorded and reused.
- *Tale with no ending and/or title*: The teacher may tell a story and stop just before reaching the end, asking the children to provide their own. Additionally, children may propose titles that could match the story they heard and concluded. These activities also cultivate critical thinking.

The aforementioned approaches mainly aim at enhancing children's imagination and trigger the story creation process by providing an initial point for the story plot and/or one or more initial characters. It is a fact that children at this age are often not able to write, but they are able to create stories on their own. The teacher is the one who can assist them in transforming fictional stories to actual written tales, having the children dictate their stories to him/her.

According to the Greek Kindergarten Teacher's Guide [13], ICTs could be also utilized in story making. In the current paper, this potential is explored, by facilitating story making by children through a Web 2.0 service especially built for this reason.

B. Digital Narration

Children are narrators by nature. In all human social groups and micro-societies narration among directly related people (family and/or friends) is used for transferring knowledge, attitudes and moral values within consequent generations. Furthermore, narration is used as an amusement medium for all ages. Although most people develop their ability to narrate through apprenticeship in their everyday

life, its communicable value is noticeable by educational research. Several research approaches can be found in the literature [14], [15], [16], focusing to narration as a primitive educational medium, not only in language lessons but in other subjects as well.

As multimedia technologies evolved, Digital Storytelling (DS) arose as a new narration form. According to Latham, DS is the combination of traditional, oral narration with multimedia and communication tools [17]. Actually, DS can be considered as a form of art which has evolved the last decade, utilizing music, image, video and other relevant technologies. Through the Internet, narrations regarding people's experiences and/or jobs, life, habits and interests are being shared and transmitted every day. Also oral narrations being stored in digital medium and dynamic, interactive and on demand reproduced narrations fall under the DS category.

Regarding the educational value of DS and in respect to language learning, Albers supports that in order to facilitate the development of reading ability, it is essential that teachers include technology rich in reading stimuli in their teaching programs [18]. Kullo-Albot & Polman concluded that the use of DS software can assist students as writers, as they can better organize and put in a sequence their ideas through ICTs. The realistic images that can be retrieved from the Internet inspire the children to create stories with more details and assists them in thinking more about the relation of the images and the accompanying text. Also, the study revealed that DS inspired the students to expand their creativity and discover new ways of expressing their ideas and thoughts [19]. Children, while evolving, use images as representative symbols in order to create their stories. They utilize images in order to recall the main characters of their stories, the timeline of the stories, as well as the plot, while depicting all these elements vividly [20].

Benmayor claims that DS follows a didactical approach in which students manage to materialize their cultural knowledge and their experiences in order to accomplish transferring of their thoughts via the technology (ICT), thus empowering themselves [21]. Moreover, Regan outlined the significance of *optical literacy* [22]. He claimed that teachers should seek ways of involving their students in activities which include some kind of visualization. Thus students could participate in projects including photographs, designs and thematic multimedia productions in order to retain information and knowledge. The same study indicated that students who used multimedia software became more active.

Conentry examined the positive outcomes of DS while involving young children [23]. He supported that DS allows students to work within an authentic context, develop their personal narrative approach, project and present their thoughts at a community of classmates in order to receive feedback. Besides, according to Jonassen et al, topics that involve oneself are quite attractive and motivating for children, thus transforming the corresponding learning activities to activities of personal engagement. Concluding, the advantages of DS appear to be: motivation deriving from interest to the topic of the activities, spiral process of involvement, the development of metacognitive dexterities, collaboration and innovative outcomes.

III. RESEARCH APPROACH

The significance of Fairy Tales in children's everyday life has been outlined in Section II. Educators have been using tales while teaching young children for many years, in multiple ways. Reading as well as creating stories is a very motivating activity for children, especially in Kindergarten.

On the other hand, the evolvement of ICTs and their integration into the educational process provide teachers with the means to experiment with new forms fairy tale creation, such as DS, using multimedia resources. Several DS systems are available online, for educational or general use. The presented research was based on a Web 2.0 service, Tikatok (<http://www.tikatok.com/>). It is a free service which requires user registration. The purpose of Tikatok is to assist children under 13 years old to create their own books, acting as authors. Initially, the main layout of a blank book is presented. It contains a cover page, an acknowledgement and/or dedication page, a back cover and several empty pages (the user can add more pages at will). In the latter, the user may add text and images and position them within the pages. Several thematic categories of books are available, guiding children in story making through appropriate questions (Fig. 1). Alternatively, the user may construct a story in a free manner. Images can be selected from the integrated library, acquired through Internet or uploaded from the user's computer. Any registered user can save his/her "books" which are available for other registered users to browse and see. These books can be viewed freely within the Tikatok platform or ordered in hard copies by any user, with the appropriate money compensation. Barnes & Noble, the company behind Tikatok try to commercially utilize the service in this manner. The personal data of the author are included only to his/her own copies (electronic or printed). The other users receive copies with a blank back cover, as required by the privacy policy of Tikatok.



Figure 1. The Tikatok service User Interface.

The aim of the research is to examine *the effect of the digital medium (Computer) in fairy tale creation, with children undertaking the role of the author–narrator.*

A research was conducted in a public Kindergarten, in Greece, with the participation of 8 students, during April 2011. Two students of the population were male and 6 female. For the study, the following material was used: Crayons, colored pencils and markers, erasers, paper cartons, plain paper, ribbons and scissors, a laptop with internet connection, a digital audio recorder and a photo camera.

The core aim of the study was the differences in story making by children when using a computer, in correlation with the traditional approach, attempting to distinguish possible differences. The children formed 4 random pairs and were assigned an equal number of tasks. The trigger for all the tasks was the same and related to Easter vacations which were approaching. A short story was narrated, involving a Chicken who laid only one egg and was puzzled on how to utilize it. The traditional Easter customs in Greece require that eggs are boiled and colored, usually red. People crack eggs in pairs while exchanging wishes, right after the celebration of the Resurrection (Greece is mainly a Christian Orthodox country). Following this narration, the 4 groups were asked to complete the story from that point onwards.

The groups worked in different settings, as follows: Group A was introduced to the Tikatok service and constructed their story entirely in the electronic medium, selecting images for illustration from the Internet or by uploading their own drawings. A blank book was provided to Group B. The book was manufactured by blank pages (size A5) binded together by piercing them and tying them with a colored ribbon. Also paper cartons pieces were used as the covers (front and back) of the “book”. The children of Group B were asked to fill in as many pages as they wanted for writing down their story, illustrating it with their own drawings. The same setting (manufactured book) was used for Group C, but the children were asked to illustrate their story using images from the Internet. Both Groups B and C could request additional blank pages for their books, if they wanted to produce bigger stories. Finally, Group D was asked to construct a story using plain A4 size paper. The children were supposed to draw freely in order to illustrate their story and decide on where they would insert written text and how many pages they were going to use.

In all cases, children were supported by the researcher, mainly for inserting written text and browsing through the Internet. The researcher was a simple mediator for the children’s will, by writing down text that the latter dictated or by operating the computer while browsing for images. Thus the possibility of biasing the story creation process was minimized. The extend of the stories (number of pages) and the formatting of the pages were exclusively the children’s decisions, taken after team negotiation. All groups worked independently, at different time periods. While each group worked on a story, the rest of the children were involved in other activities with their teacher, in another classroom. Consequently there was no interference between the groups. Every group worked for about 60 minutes on their story.

Research data were gathered using mainly observation as a collection tool. Several research questions were formulated during the design of the presented approach. In this paper we focus on the overall effect of the electronic medium in the story creation process by examining elements, such as: story size, vocabulary used, relevance of the images used for illustration with the text and story sequencing.

IV. RESULTS

The aim of the study was to examine possible differences in the various experimental settings. The data collection was carried out through observation notes and audio recording transcription, as well as analysis of the actual products of the activities, namely the stories.

Group A created the story entirely working on a computer. The participation was extremely motivated and the collaboration was intense. After finishing their story they had the opportunity to print it which was very much appreciated by the children and seemed to make them proud of their work. Thus added value was provided to their product. Regarding the construction of the story, the facility of adding more pages to the proposed book format operated as a motive for expanding the story. Specifically the students of Group A stated that they wanted to create a “Big story”. Many formatting and positioning options were available within the Tikatok platform, leading to intense negotiation among the group members in order to reach a common decision. The entire story was created collaboratively with the students negotiating every detail of it (text, illustration, page formatting, etc). In particular, they selected the images for illustrating their story very carefully, substantiating their choices through negotiation.

Group B created a story using the provided “empty book” and were asked to draw images in order to illustrate it. In particular, they decided together on how to illustrate the story and divided the work, with each child undertaking a part of the story to draw images for. The content of each drawing was pre-agreed. The empty book operated as a motive for creating a story, as the students aimed at filling all the provided pages. When illustrating they decided to draw in one and add text to the other of each two opposite pages of their book. They considered that by adding text in one of the pages, no room would be left for drawing and thus they used the opposite page for that matter. The members of Group B were satisfied with their work and continued to discuss upon it even after its completion.

Group C used the same empty book, but was asked to use images from the Internet in order to illustrate the produced story. The provided book and the use of the computer highly motivated the children to participate and collaborate throughout the activity. In this case, the children chose to allocate text and image in the same page, as opposed to the members of group B. The students chose their images very carefully, negotiating and reaching common decisions for each one of them. The selected images were printed and attached to the corresponding page with common glue. The fact that the children could not receive immediate visual feedback on how the pages they designed would be and instead they had to wait until they finished the whole story in

order to print the images and attach them to their book, seemed to slightly annoy them. They would rather finish each page before they proceeded to the next one, which was not possible as there was no printer available in the classroom. Consequently they had to select all their images and wait for the researcher to print them.

Group D was encouraged to create a story, using paper and colored pencils. No book structure or anything else was provided to this group. Having thought through their story together, the members of Group D decided on how to present it. They decided collaboratively on what the drawing of each child would depict, but preferred to draw individually. They created one drawing in an A4 size paper each and indicated where they wanted written text to be inserted. They decided that it would be inserted above each drawing, occupying a small space on the paper's top side. As they stated, "*We will leave some room up here only, so that there will be more drawing*". They did not request to produce a cover (front or back) and the final size was 2 pages. The choices made regarding the size of the story were made by the students themselves, with no intervention by the researcher.

Regarding the main research question, *how much and in what way does the use of computer affect story creation*, several elements of the produced stories were examined. The *size of the story* was affected by the computer use. Group A created a story consisting of more words than the other 3 groups, almost double than the second one (Table I). The number of words includes the story titles and the dedications that the children wrote (Groups A,B and C) at the beginning of their stories. Also the plot was thicker for Group A, involving 7 places in which the story took place and 8 transitions among them. Groups B and C used 3 sceneries

and 2 transitions accordingly, whereas the story created by Group D occurs at one place only (Table I). The increased number of transitions and sceneries did not affect the *story sequencing* at all, for Group A. The story was very well structured in a logical way, as opposed to Group C and even more to Groups B and D in the stories of which the transitions were stiffer and rather awkward. For instance, in the story of Group A, the little chickens were playing in the playground and hurt themselves. Their mother took them to the doctor and then they returned home in order to heal. After that they went out of their house again. In Group B, the main character of the story, a little chicken is at home and then it appears at another house with no actual logical relevance to the previous location. Also in Group C, the chickens were born (the eggs hatched), went home and then straight to Church in order to celebrate the Resurrection. In this case, the transitions are rather stiff and the consequent places do not really connect in a logical manner, although they sequence is not erroneous. Finally, Group D presented no transitions at all and the story was single-dimensional.

TABLE I. STORY SIZE ELEMENTS

Group	A	B	C	D
Story size (words)	309	157	121	143
Scene changes	8	2	2	0
Sceneries	7	3	3	1
Pages	16	10	8	2
Images used	25	6	17	2



Figure 2. Illustration complementarity to written text (Group A).

Furthermore, Group A used more pages in their story (Table I). This was mainly due to the fact that the children decided to break their text into smaller sections in order to further enrich it with illustrations. Thus, *the relevance of the*

images with the text was very high in this case, as they decided to proceed likewise in every single page. The text in every page was in direct relation to the contained images, mainly describing them. In one page, a dialogue in a cartoon-

like approach was used, complementary to the adjunct text (Fig. 2). This was a type of interaction between the written text and the illustration of the story. In the cases of Groups C and D, the images were more abstract and depicting something that was references in the adjunct text. For example the page in which the story describes that the chickens went to the Church is presented in Fig. 3. The corresponding image is a photograph of a Church.

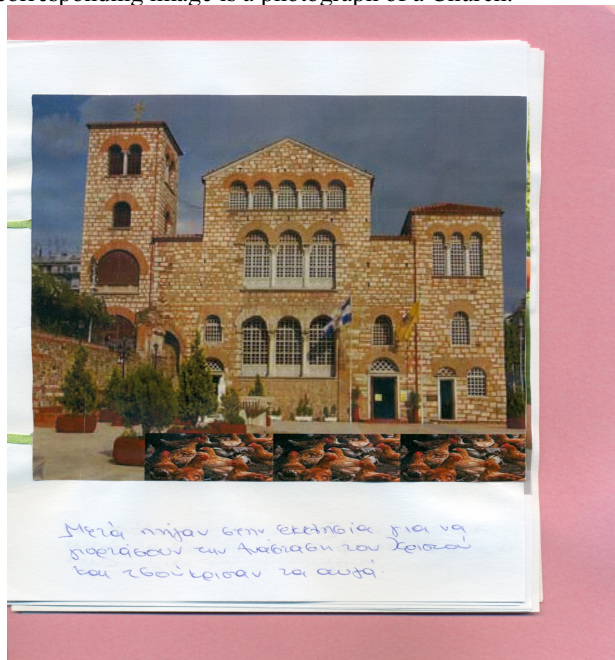


Figure 3. Illustration example (Group C).

Another factor which was affected by the computer use was that of illustration. As seen in Table I, Groups A and C which used the Internet to acquire images, used more of them for illustrating their stories. Specifically, Group A used 4 times more images than Group B and 12 times more images than Group D, which both used their own drawings. Likewise, the corresponding differences for Group C are 3 and 8 times accordingly. It is obvious that using images from the Internet is easier than drawing them. On the other hand, children were not satisfied by using one image at a time, but instead they tried to merge images in order to better visualize their stories. The initial dialogue analysis reveals that they spent significant amount of time in order to locate and download the proper image, justifying their choices during group-internal negotiation. Another interesting observation is that Group A also decided to draw an image which then was uploaded and inserted in their Tikatok based story. They were free to illustrate their story at will and it would be reasonable to expect that they would only try to find images on the internet, as it seems to be easier in process. Nevertheless, they decided to include their drawing as well.

Regarding the vocabulary used by the children, no significant differences were observed. Although the research hypothesis formulated was that Group A would be more likely to use a wider variety of words as well as more

difficult words, due to the computer presence, all the students used words of similar complexity and variety.

Going back to the examining the size of the stories in matters of pages used, interesting observations can be made. As aforementioned, Group A used more pages mainly due to the fact that the children decided to break their text into smaller sections. On the other hand, Groups B and C used similar number of pages, with Group B requesting additional paper for their “Empty books”. The difference between Groups A, B and C with Group D is enormous, as the latter used only 2 pages (Table I).

It seems that the crucial factor was the existence of a fundamental book structure for Groups A, B and C to use. In the case of the Tikatok platform (Group A), the book structure was ready and the children were guided in creating their stories, following the proposed structure. Thus, there is a front and a back cover, as well as a page for dedications. In the cases of Groups B and C, the book structure was provided by binding the empty pages together with the ribbon and by using a colored paper carton (red for Group B and pink for Group C) to create the covers. This book structure is shown in Fig. 4 which also presents a sample of the story created by Group B. This provoked the students to give a title to their stories and adding it to the front cover. They even illustrated the front cover, using the illustration method that was available (drawings or images from the Internet, accordingly). Furthermore, they added dedications in the first page of their books, even though that was not required. As aforementioned, the four groups worked separately from each other, thus not interacting or interfering at all. Consequently, Groups B and C did not know that Group A constructed an illustrated cover page, provided a title and wrote dedications. The book structure seemed to be the key factor towards this implementation.

Of course, all children have seen many books and especially fairy tales in their everyday life, by the age of 4 or 5 years old. Thus, they seemed to try to follow their perception of what a fairy tale should look like. This was triggered only by the provided book structure, which resembled any common book. In the case of Group D which had no assistance of any kind (not even the empty book), the above elements are missing. The children did not think on their own that they should select a title or that they should present their stories in a way that resembles a book. A sample page of the story created by Group D can be seen in Fig. 5.

Consequently, the provided book structure seemed to motivate children into creating bigger stories, following a more structured approach. The image of the empty book in all three cases (Groups A, B and C) provoked the children to operate as book authors. The fact that they were able to add new pages if needed enhanced their motivation too. As some of them stated, this “made them want to create big stories in order to fill the pages”. Of course, careful examination of the stories’ content shows that the stories were concrete and were not created only so that the pages could be filled. Another important observation is that the book covers seemed to be the most significant factor. Children often use paper with some kind of binding. For example they use

notebooks, textbooks, paper blocks, etc. Usually at these ages (4-5 years old) the main use is drawing images or attempts to write letters and words (their name is what they try to write in their initial attempts). Often they try to enrich their drawings with a story which is created instantly in their minds, if someone asks them why they decided to draw a certain image. Even then, the story exists in their mental state but is not presented in the paper they use. Even if they try to draw a series of images or create a story with the observation and assistance of an adult (e.g. a parent), the fact that paper

blocks follow a book structure (there is a paper binding) does not motivate them to create book-like stories. Thus, the “book simulation” created by the front and back covers seemed to be the main trigger for their actions, leading them to create bigger and well structured stories. The electronic medium affected them more, by providing means that facilitated the construction of the distinct book elements (title, illustration, front cover, back cover, dedications and content).

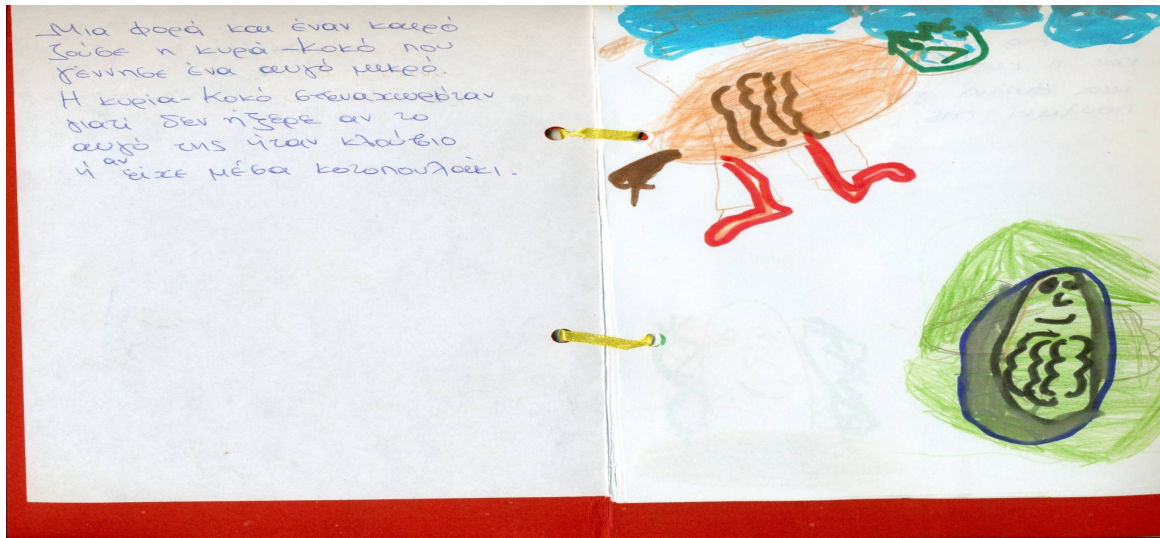


Figure 4. Sample page (Group B).



Figure 5. Sample page (Group D).

Concluding, the presence of the computer seemed to affect the process of creating stories in multiple ways. Although providing a book structure seems to be the key element for well structured stories to evolve, both with and without the electronic medium, the effect of the computer in several qualitative aspects of the story was significant. Group

A used more pages, more words, more images and constructed a better structured story, with satisfactory scenery transitions (quantitatively and qualitatively) and tighter connected illustration with the written text. Also Group C worked more intensively in illustrating their story than the two groups which did not use a computer at all. The

children's motivation was increased and the activity products indicate that the groups were more effective when using a computer.

V. DISCUSSION – FUTURE WORK

The research approach presented in the current paper aimed at examining the effect deriving from involving ICTs in fairy tale creation by Kindergarten students. The findings reveal that this effect is significant and positive. The children constituting Group A constructed a better fairy tale in many aspects. Their story was bigger, counting number of pages, words and images. The sequencing of their story was more interesting, the plot thicker and the scenery transitions more justified and accurate. Also Group C negotiated more regarding the illustration of their image, trying to locate images on the internet that would better depict the actions and the overall behavior of the characters in their stories.

Another important issue is the provision of a book structure to three out of four groups. The results indicate that it significantly affects the story creation process, by assisting the children to better formulate and present their thought.

This paper focused mainly on the effect of the digital medium. Keeping in mind that ICTs are always an intriguing tool for the children to work with, an increase in motivation was expected. Also the ease of acquiring images from the Internet allowed the students to better illustrate their stories, providing an added value to their story. The fact that in Group A some images included dialogue using text balloons and operated complementarily to the written text, indicates that the students attempted to proceed to a whole new level of story creating.

Other research questions were formulated when designing the current approach. They were related to collaboration issues during the story making process, children's creativity, formulation and presentation of thoughts, motivation, imagination and expression. The data are still under analysis in order for these questions to be addressed. On the other hand, the illustration of the stories turned out to be a very interesting issue. Initial analysis of observation and audio recording data reveal that intense negotiation took place among group members in order to select the more representative images and fully connect the image with the written text in order to justify the choice. The content of the stories and the relation with the images in correlation with the children's dialogues have to be analyzed in order to distinguish the effect of the digital medium to cognitive aspects of children related to imagination, expression, thinking and argumentation. Also the actual illustration content is an interesting element of analysis for examining how children perceive images when reading stories. It is common for parents to observe their under 5 years old children "read" fairy tales, even though they cannot actually read, just by expressing their perceptions of the illustrations. Additional research seems necessary towards this direction. Finally, the actual plot of the stories and the relation with the children's real life experiences seems interesting, as only Group C connected their story with the forthcoming Easter vacations at the time the research was conducted. The others seemed to project personal

experiences on their stories. This factor is still under examination and further discussions with the corresponding students are designed.

Finally, additional case studies are required in order to validate the findings of the research, presented in the current paper, allowing their generalization with more concrete data.

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Kindergarten children's motivation and collaboration being triggered via computers while creating digital stories: a case study

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Abstract: Fairy tales exist for centuries and have intrigued educators who have been utilising their 'magical power of affection', especially when teaching young children. In the current paper, story creation is examined with the perspective of the children as authors. A Web 2.0 service, Tikatok, which provides several facilities for creating stories in a book-like format, is utilised in order to examine the effect of the digital medium (ICTs) in the story creation process by the children. Eight kindergarten students divided into four pairs, worked in different settings. The results show an impressive effect of the computer on children's motivation, as well as several qualitative aspects of story creation.

Keywords: story telling; Web 2.0; kindergarten.

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1 Introduction

Fairy tales are the cultural heritage of every nation. All cultures through time have their own, oral or written, tales to show. Initially, fairy tales were addressed to adults for amusement or relieving purposes. Over time, tales have evolved to become products of famous writers, as well as an ordinance for children whose educational value has also been accounted for. Fairy tales are being successfully used by teachers as an educational tool for many years, mostly in preschool and early primary education.

Especially for creating a fairy tale, several methods can be used for assisting children create their own stories. Apart from the traditional methods, technology provides opportunities and tools to the educators in order to experiment with innovative methods of story creation, such as digital narration. The latter is the combination of traditional, oral narration and interactive, multimedia technologies. Several digital narration tools are available nowadays, addressed to young children. The current paper studies the creation of stories by children through digital tools, in comparison with the traditional method.

Specifically, the core aim of the presented study is the examination of the possible differentiation in story creation by preschool students, due to the use of digital story making software (the Tikatok online service is used). Also the study aims at researching whether the provision of a predefined book-like structure, which is provided by Tikatok, facilitates story making by young students.

The paper is structured as follows; initially the theoretical background is presented, focusing on fairy tales utilisation and digital story telling. Then the methodology is explained and the research questions are formulated. Finally, the results of the conducted experiment are presented, before the concluding discussion.

2 Theoretical background

2.1 *Genesis and origin of the fairy tale*

Fairy tales are being told as long as human beings exist on earth. Every nation and culture has produced its own tales, oral or written. Hardly in the dues of the 19th century, through the primitive populations' narrations was the common origin between the European and the global fairy tale realised. Thus, the most archaic narrative specie given birth from the human need of historical imprinting and communication of various social teams but also from our personal need expression reached nowadays with its original memories.

Tales existed in ancient times. We are not sure where or how any of the folktales originated, but the tales grew and changed as they passed from one teller to another. It is

still a quality of the fairy tales we tell today that they can be narrated in different ways and yet remain the same story [Nodelman, (1992), p.159]. According to Delonis (1986), "it is impossible to imagine a mother not telling bedtime stories to her child in order to soothe his/her fears and anxieties". Initially, fairy tales were addressed to adults for their amusement. Later in time, tales were also addressed to children and evolved to become a capitulary for them. Of course, over the time new elements are being added in older tales and stories or the existing ones are being updated, based on the current era and social status, each time. The first tales could be found during the third and second millennium in the Sumerian Epic Gilgamesh, in the animistic tales of Mesopotamia, and in the Egyptian story of two brothers [Ben-Amos, (2005), p.257]. A little later, tales could be identified in the Sanskrit fairy tales, namely in the Indian *Pānhatantra (the Five Books)* which served to the education of Indian aristocracy [Ranke, (1981)]. Archetypal fairy tales and fables could be met in 1,000 BC China, as well as in Buddhist India. Islamic invasion in India, during the 10th AD century, marked the transmission of oriental fairy tale from the depths of Asia to both Africa and Europe. Archilochos [725 BC] and Hesiod [750 BC] were familiarised with fairy tales [Haase, (2008), p.6]. But Hesiod's writings, especially in *Theogony*, one of the main documents of Greek mythology, as it clarifies the positions of all the gods, goddesses, demi-gods, demons, humans and heroes in Greek mythology along with fictional fairy tale and myths, provided much more than a few fairy tales about the Olympian gods (Griffin, 1986). Plato in both his work, *The State and Laws* makes mention on those grandmothers (old women) and nannies who utilised fairy tales for the intellectual nourishment of young children (Cooper and Hutcinson, 1997). Aristotle, on the other hand, argues that mothers should use these fictional narrations as lullabies (Barnes, 1995).

2.2 *Definition and classification*

An attempt to determine the nature of the fairy tale reveals several approaches in the existing literature. The term 'fairy tale' initially appeared in English language in 1749 as a translation of the French term *conte de fée*, which Comtesse d' Aulnoy used in the title of her book published in 1679. In the dues of 18th century in both England and Germany, speakers employed various terms to determine their fictitious oral accounts [Ben-Amos, (2005), pp.255–256]. What eventually prevailed, were the terms 'tale'/'fairy tale' and 'Märchen', a term which emanating from the word 'Mär', meaning news, noise in the run, narration (Jean, 1993). On the other hand, Thompson (1946) describes tales as actually formed narrations involving sequences of patterns or episodes. As a literary type/genre, tales are characterised by universality, vagueness of time and space as well as the facilitation the adoption of the otherness so as to allow the evolvement of local, cultural diversities. Nowadays, as we have developed knowledge on the similarity in folktales told widely in different parts of the world, it has become common to categorise tales mainly under two categories: traditional and literary. Once fairy tales were collected and retold for children, they function as models for writers like Hans Christian Andersen, Oscar Wilde and others. This sort of story they wrote, based of course on traditional fairy tales but often to a large extent different from them is called a literary fairy tale [Nodelman, (1992), p.171]. Nevertheless, all tales have common, fundamental elements.

There is an innate relation and interaction between theories of the origin and classification of fairy tales. In their genre classification, we meet three different proposals:

- a At categories, where an 'archetypal core' is sought. In this proposal, discrimination is based on the content as well as on seven fairy-tale categories: the mythological, the magic, the biological, with animals, origin's fairy tales, funny and moral fables [Wundt, (1960), p.346].
- b In cases where narrations are analysed, the variants of each fairy tale type are thoroughly examined. Their age is evaluated, together with the restoration of their initial form. This international scientific classification was selected in the Aarne-Thompson (AaTh or AT) list, which numbers almost 2,000 fairy tale types (Aarne and Thompson, 1964).
- c At least two distinct forms of structural analysis (usually based upon an a priori principle of binary oppositions) which seek to describe the pattern and, allegedly, underlies the folkloristic text. Propp (1968) broke up fairy tales into sections. He also identified a series of sequences that occurred in Russian fairytales and deliver 31 functions as a unique, fundamental and regularly constitutive part of any fairy tale.

2.3 The pedagogic value of the fairy tale

For starters, every tale is a narration, always objective and personal, although the narrator is usually detached from the actual story, allowing several variations of the basic narrative structure (Jean, 1993). Also, tales constitute a world of fantasy, where the laws of nature do not apply and miracles happen. Tales occur 'once upon a time' or 'once at a far away land', including heroes with symbolic names, based on their characteristics (e.g., clothing, appearance, habitual, etc.) (Propp, 1968).

Overall, fairy tales usually intrigue children, capture their attention and allow them to project themselves to imaginary places and upon imaginary heroes (Jean, 1993). For that matter, fairy tales are the most significant constituent of children's literature, even during the digital age we live in. Children's imagination is quite vivid and they like to identify with tale heroes, mainly talking animals or other imaginary creatures who share the same needs, wishes and abilities with the children. The world of the fairy tales allows children to understand and face the real world (Kanatsoouli, 2007). Through fairy tales symbolic imagination is evolved. That is, children approach the real world by projecting symbolic figures from the imaginative world, thus gaining social thinking and increasing their self respect (Anagnostopoulou, 2002).

Since the 14th century, (but substantially with Charles Perrault in the 17th century), the Grimm brothers' and Christian Andersen's fairy tales proved, in 19th century, their silent and indirect pedagogic/educational quality. Fairy-tale characters are often connected with their special attributes, which become extension of their inner qualities [Nikolaeva, (2002), p.173]. Through unconscious mechanisms the child's *identification* with the fictitious characters of the fairy tales is achieved rather effortlessly. These characters actually function as exemplars, according to Freud and Jung [Papantonakis, (2009), pp.126–128]. The pleasure children draw from them, as well as the significant role of imagination in their development, is decisive, because/since they lead to the promotion, enrichment and stimulation of thought (Haviland, 1998).

Psychologists and educators have debated over tales, through the literature. From the time of Plato or when the Grimm Brothers appeared, adverse criticism was brought in tales regarding the element of ferocity (Petrovic-Androutsopoulou, 1992). Nevertheless,

Maria Montessori recommends the use of fairy tales, omitting frightening and magical elements, for teaching children under seven years old, due to the fact that they still find it difficult to distinguish real from imaginative life (Petrovic-Androutsopoulou, 1992). Tales can be used to teach children while amusing them, allowing them to think and develop cognitive and social dexterities, as well as initiatives. Specifically, the pedagogical and educative value of fairy tales consists in several constituents, provided that they (Ntoulia, 2010):

- cultivate native language through re-narration and dramatisation
- intrigue imagination and develop creativity, expand thinking and utilise children potential
- cultivate and exercise memory
- motivate symbolisms and meaning making
- familiarise children with several art forms
- exercise children in 'reading the images' or 'reading between the images', cultivating book worming of the images
- cultivate collaboration and enhance critical and creative thinking of children
- contribute to the full scale psychokinetic, cognitive, perceptive and emotional development of children.

2.3.1 Children as writers

Writing a story (or a book, an article, etc.) is not always easy. For one to be a successful writer, he/she needs to know *to whom* the manuscript is addressed, *for what reason* is the manuscript written and *what does the writer want to talk about*. A good story needs a main character, regardless if that character is human or not, time and space of existence, evolvment and a concrete end. The writer has to be familiar with these elements in order to utilise and manage them accordingly (Zouboulaki, 2007). Apart from all the aforementioned elements, several writing techniques exist, in order to achieve the desired result.

When the writer is a child, some issues need to be examined differently. Though not deprived of sensibility, children, as a rule, cannot give to the text a literary form. They usually repeat, with minor differentiations, what they have read or seen, and what has affected them emotionally. Nevertheless, they do not have the maturity to mould literary characters (exceptions such as the young writer Samhita Arni, who wrote *The Mahabharata. A Child's View*, and which constitutes an editorial phenomenon, simply confirm the rule). Children need something to trigger their interest and motivate them to create their own stories. They can learn how to write through games and they can be introduced in the narrative space through fairy tales that, by far, are their more easily accessible literary genre. Through fairy tales children can learn ways of handling the narrative material, as well as techniques that help them appraise simultaneously the existing circumstances and cultural delivery.

Creative writing could be seen as a contemporary educational technique that experientially approaches speech and its vitality, combining, in such a manner, learning with play. Creative writing's objectives involve children's familiarisation with speech,

exploration of their linguistic capacities and detection of individual ways of writing. Children are creatively occupied, thus cultivating from an early age a personal relationship with words and possible ways of their combination, to shape a homogeneous whole. This pleasant exploration of the universal words accentuates their faculty of expression, develops their inventiveness and, finally, offers them the possibility to discover and to confidently develop their writing status/profile.

For that matter, Rodari (1997) refers to ways of facilitating story fabrication by children. The simplest, a specific word or a couple of non-relevant ones with an approach, strange enough to trigger the children's imagination, thus leading to the formulation of an imaginary relation set between these words. According to Rodari (1997), this is a very effective approach which can be improved by exercising. Another approach is the use of hypothetical questions; 'what would happen if...'. Furthermore, deliberate distortion of words can transform them into productive initiation points of a story. Also a very popular method for triggering children to create stories is that of altering the content of existing, well known stories or by simply adding an 'afterwards' part to them. In the latter case, children can be asked to continue the story after its 'formal' end, with the advantage that they already know the characters that take part in it, as well as their behaviour norms.

Specifically in kindergarten, several methods can be applied for facilitating fairy tales' creation by children (Papanikolaou and Tsilimeni, 1992):

- *Creating a story with images:* Children can use old, torn books/tales they might have in order to create their own fairy tales. After cutting out images, they can attach them to big, folded cardboards, thus creating a 'book'. This kind of activity also facilitates assortment, memory and observation. The images may follow a timely and/or logical sequence. Scrambling the images can create a new story. Then, the teacher can assist the children by adding text to the images, dictated by them.
- *Improvisation:* As Dewey states, "in order to teach someone to think, one has to teach him/her to fabricate". Thus, in kindergarten children should be induced to improvise in story making, by receiving several stimulants. The latter can be images, photographs or a question and answer game. The improvisations could be recorded and reused.
- *Tale with no ending and/or title:* The teacher may tell a story and stop just before reaching the end, asking the children to provide their own. Additionally, children may propose titles that could match the story they heard and concluded. These activities also cultivate critical thinking.

The aforementioned approaches mainly aim at enhancing children's imagination and trigger the story creation process by providing an initial point for the story plot and/or one or more initial characters. It is a fact that children at this age are often not able to write, but they are able to create stories on their own. The teacher is the one who can assist them in transforming fictional stories to actual written tales, having the children dictate their stories to him/her.

According to the *Greek Kindergarten Teacher's Guide* (Dafermou et al., 2006), ICTs could be also utilised in story making. In the current paper, this potential is explored, by facilitating story making by children through a Web 2.0 service especially built for this reason.

2.3.2 Digital narration

Children are narrators by nature. In all human social groups and micro-societies narration among directly related people (family and/or friends) is used for transferring knowledge, attitudes and moral values within consequent generations. Furthermore, narration is used as an amusement medium for all ages. Although most people develop their ability to narrate through apprenticeship in their everyday life, its communicable value is noticeable by educational research. Several research approaches can be found in the literature (Applebee, 1978; Stein and Glenn, 1979; Stadler and Ward, 2005), focusing to narration as a primitive educational medium, not only in language lessons but in other subjects as well.

As multimedia technologies evolved, digital storytelling (DS) arose as a new narration form. According to Lathem (2005), DS is the combination of traditional, oral narration with multimedia and communication tools. Actually, DS can be considered as a form of art which has evolved the last decade, utilising music, image, video and other relevant technologies. Through the internet, narrations regarding people's experiences and/or jobs, life, habits and interests are being shared and transmitted every day. Also oral narrations being stored in digital medium and dynamic, interactive and on demand reproduced narrations fall under the DS category.

Regarding the educational value of DS and in respect to language learning, Albers (2007) supports that in order to facilitate the development of reading ability, it is essential that teachers include technology rich in reading stimuli in their teaching programmes. Kullo-Albot and Polman concluded that the use of DS software can assist students as writers, as they can better organise and put in a sequence their ideas through ICTs. The realistic images that can be retrieved from the internet inspire the children to create stories with more details and assists them in thinking more about the relation of the images and the accompanying text. Also, the study revealed that DS inspired the students to expand their creativity and discover new ways of expressing their ideas and thoughts (Kullo-Albot and Polman, 2008). Children, while evolving, use images as representative symbols in order to create their stories. They utilise images in order to recall the main characters of their stories, the timeline of the stories, as well as the plot, while depicting all these elements vividly (Raines and Isabell, 1999).

Benmayor (2008) claims that DS follows a didactical approach in which students manage to materialise their cultural knowledge and their experiences in order to accomplish transferring of their thoughts via the technology (ICT), thus empowering themselves. Moreover, Regan (2008) outlined the significance of *optical literacy*. He claimed that teachers should seek ways of involving their students in activities which include some kind of visualisation. Thus, students could participate in projects including photographs, designs and thematic multimedia productions in order to retain information and knowledge. The same study indicated that students who used multimedia software became more active.

Coventry (2009) examined the positive outcomes of DS while involving young children. He supported that DS allows students to work within an authentic context, develop their personal narrative approach, project and present their thoughts at a community of classmates in order to receive feedback. Besides, according to Jonassen et al. (2003), topics that involve oneself are quite attractive and motivating for children, thus transforming the corresponding learning activities to activities of personal engagement. Concluding, the advantages of DS appear to be: motivation deriving from

interest to the topic of the activities, spiral process of involvement, the development of metacognitive dexterities, collaboration and innovative outcomes.

3 Research approach

As stated above, fairy tales hold a significant role in children's everyday life. Educators have been using tales while teaching young children for many years, in multiple ways. Reading as well as creating stories is a very motivating activity for children, especially in kindergarten.

As technology evolves, ICTs are increasingly exploited for the design and implementation of innovative teaching approaches. In this paper a research based on a Web 2.0 service, Tikatok (<http://www.tikatok.com/>) is presented. It is a free service addressed to 7–13 years old children, assisting them to create their own books, acting as authors. The main layout of a blank book is provided, containing a cover page, an acknowledgement and/or dedication page, a back cover and several empty pages (the user can add more pages at will). In the latter, the user may add text and images and position them within the pages. The user can construct a story by filling the blank pages or by following a predefined, thematically-oriented set of questions (Figure 1). Images can be selected from the integrated library, acquired through internet or uploaded from the user's computer. Any registered user can save his/her 'books' which are available for other registered users to browse and see. These books can be viewed freely within the Tikatok platform or ordered in hard copies by any user, with the appropriate money compensation. The personal data of the author are included only to his/her own copies (electronic or printed). The other users receive copies with a blank back cover, as required by the privacy policy of Tikatok.

Figure 1 The Tikatok service user interface (see online version for colours)



The core aim of the research was to examine *the effect of the digital medium (computer) in fairy tale creation, with children undertaking the role of the author-narrator*. A research was conducted in a public kindergarten, in Greece, with the participation of

eight students, during April 2011. Two students of the population were male and six female. For the study, the following material was used: crayons, coloured pencils and markers, erasers, paper cartons, plain paper, ribbons and scissors, a laptop with internet connection, a digital audio recorder and a photo camera.

The core aim of the study was the differences in story making by children when using a computer, in correlation with the traditional approach, attempting to distinguish possible differences. The children formed four random pairs and were assigned an equal number of tasks. The trigger for all the tasks was the same and related to Easter vacations which were approaching. A short story was narrated, involving a chicken who laid only one egg and was puzzled on how to utilise it. The traditional Easter customs in Greece require that eggs are boiled and coloured, usually red. People crack eggs in pairs while exchanging wishes, right after the celebration of the Resurrection (Greece is mainly a Christian Orthodox country). Following this narration, the four groups were asked to complete the story from that point onwards.

The groups worked in different settings, as follows: group A was introduced to the Tikatok service and constructed their story entirely in the electronic medium, selecting images for illustration from the internet or by uploading their own drawings. A blank book was provided to group B. The book was manufactured by blank pages (size A5) binded together by piercing them and tying them with a coloured ribbon. Also paper cartons pieces were used as the covers (front and back) of the 'book'. The children of group B were asked to fill in as many pages as they wanted for writing down their story, illustrating it with their own drawings. The same setting (manufactured book) was used for group C, but the children were asked to illustrate their story using images from the internet. Both groups B and C could request additional blank pages for their books, if they wanted to produce bigger stories. Finally, group D was asked to construct a story using plain A4 size paper. The children were supposed to draw freely in order to illustrate their story and decide on where they would insert written text and how many pages they were going to use.

In all cases, children were supported by the researcher, mainly for inserting written text and browsing through the internet. The researcher was a simple mediator for the children's will, by writing down text that the latter dictated or by operating the computer while browsing for images. Thus, the possibility of biasing the story creation process was minimised. The extend of the stories (number of pages) and the formatting of the pages were exclusively the children's decisions, taken after team negotiation. All groups worked independently, at different time periods. While each group worked on a story, the rest of the children were involved in other activities with their teacher, in another classroom. Consequently there was no interference between the groups. Every group worked for about 60 minutes on their story, although there was no such limitation by the teacher and/or the researcher. It has to be noted that all groups made decisions regarding their story and the illustration themselves, without the researcher arguing for or against their decisions. These involved number of pages to use, layout of the pages, amount of pictures and text, etc. Each group initially decided upon these matters, before proceeding to the implementation of the actual story.

Research data were gathered using mainly observation as a collection tool. Several research questions were formulated during the design of the presented approach. In this paper we qualitatively examine the overall effect of the electronic medium in the story creation process by focusing the children's collaboration and their motivation to create stories when using computers.

4 Results

The aim of the study was to examine possible differences in the various experimental settings. The data collection was carried out through observation notes and audio recording transcription, as well as analysis of the actual products of the activities, namely the stories.

Group A created the story entirely working on a computer. The participation was extremely motivated and the collaboration was intense. After finishing their story they had the opportunity to print it which was very much appreciated by the children and seemed to make them proud of their work. Thus added value was provided to their product. Regarding the construction of the story, the facility of adding more pages to the proposed book format operated as a motive for expanding the story. Specifically the students of group A stated that they wanted to create a 'big story'. Many formatting and positioning options were available within the Tikatok platform, leading to intense negotiation among the group members in order to reach a common decision. The entire story was created collaboratively with the students negotiating every detail of it (text, illustration, page formatting, etc). In particular, they selected the images for illustrating their story very carefully, substantiating their choices through negotiation.

Group B created a story using the provided 'empty book' and were asked to draw images in order to illustrate it. In particular, they decided together on how to illustrate the story and divided the work, with each child undertaking a part of the story to draw images for. The content of each drawing was pre-agreed. The empty book operated as a motive for creating a story, as the students aimed at filling all the provided pages. When illustrating they decided to draw in one and add text to the other of each two opposite pages of their book. They considered that by adding text in one of the pages, no room would be left for drawing and thus they used the opposite page for that matter. The members of group B were satisfied with their work and continued to discuss upon it even after its completion.

Group C used the same empty book, but was asked to use images from the internet in order to illustrate the produced story. The provided book and the use of the computer highly motivated the children to participate and collaborate throughout the activity. In this case, the children chose to allocate text and image in the same page, as opposed to the members of group B. The students chose their images very carefully, negotiating and reaching common decisions for each one of them. The selected images were printed and attached to the corresponding page with common glue. The fact that the children could not receive immediate visual feedback on how the pages they designed would be and instead they had to wait until they finished the whole story in order to print the images and attach them to their book, seemed to slightly annoy them. They would rather finish each page before they proceeded to the next one, which was not possible as there was no printer available in the classroom. Consequently they had to select all their images and wait for the researcher to print them.

Group D was encouraged to create a story, using paper and coloured pencils. No book structure or anything else was provided to this group. Having thought through their story together, the members of group D decided on how to present it. They decided collaboratively on what the drawing of each child would depict, but preferred to draw individually. They created one drawing in an A4 size paper each and indicated where they wanted written text to be inserted. They decided that it would be inserted above each drawing, occupying a small space on the paper's top side. As they stated, "We will leave

some room up here only, so that there will be more drawing". They did not request to produce a cover (front or back) and the final size was two pages. The choices made regarding the size of the story were made by the students themselves, with no intervention by the researcher.

Table 1 Story size elements

Group	A	B	C	D
Story size (words)	309	157	121	143
Scene changes	8	2	2	0
Sceneries	7	3	3	1
Pages	16	10	8	2
Images used	25	6	17	2

The main research question was, *how much and in what way does the use of computer affect story creation*. The research data indicated that the quantitative aspects of group performance were significantly higher when the computer was used. For example, the *size of the story* in matters of words, the *thickness of the plot*, the number of the *sceneries*, the *story sequencing* (logical scene succession), the *number of pages* and the *number of images* were significantly higher for group A and correspondingly lower for group D (Bratitsis et al., 2011).

Regarding creativity, which is examined in this paper, it appears that the use of computer had a very positive effect. The children appeared to be more inspired and thus extended their creative thinking by searching for new, different and innovative ways of expressing their ideas. Initially, the members of – group A spent more time while searching for images in the internet in order to illustrate their story. Then group C was second in time spent for searching images, whereas the two groups (B and D) which were asked to draw their images proceeded to this task after a short discussion on which member was going to draw on which page. Especially in group D, in which the story covered only two pages, each student undertook one page and individually decided what to draw on it, with no consensus by the other group member. Further examining the process of selecting images, it is evident that the children in groups A and C were more consistent in their attempt to better match their manuscript with their stories. For example, in group A the children asked for the researcher's assistance in order to edit some of the images they selected for their story, so as to better integrate the illustration to the actual story. They wanted to add text to the image, thus simulating a dialogue between the characters appearing in the image. The following dialogue among the group members A is indicative of their collaboration and thinking and refers to Figure 2:

- *child A*: it should appear as if the mother-chicken is rebuking the little chickens
- *child B*: also what the little chicken's are saying to each other should appear
- *child A*: we should use those bubbles which indicate that we are talking to each other.

This dialogue led the children in group A to select the combination of images appearing in Figure 2. The mother-chicken is telling to the little one that she is not letting them out of the house again, as they were very naughty (upper right corner in Figure 2). The two

little chickens on the left hand side of Figure 2 are saying that “Ahaha! Mother is lying, she is not going to lock us in again”.

Figure 2 Illustration complementarity to written text (group A) (see online version for colours)



Apart from enriching the illustrations with text, the actual process of selecting the images is quite interesting and indicative on how the children who worked with the computer extended their thinking and thus became more inventive and creative, while improving their collaboration at the same time. In the case of group A, the two little chickens of the story went with their mother to the carnival. There, they were allowed by their mother to ride the wheel, but one of them fell of the wheel and hurt its wing. The result was that the little chicken was bleeding at the hurting spot.

Figure 3 Choosing images – example 1 (group A)



This part of the story was illustrated, as shown in Figure 3. The students carefully chose their images, they meticulously examined them and paid attention to minor details. Usually, the selection of an image was a discussion topic for several minutes, during which the children negotiated, raised arguments and consequently reached consensus on the positioning and the appearance of the selected images. The following indicative examples reveal this process:

- *Example 1:* The image of the small chicken, appearing in Figure 3 was not random at all. This was the chicken that fell of the wheel and hurt its wing. As stated in their story, the chicken was bleeding at the hurting spot. So the students selected an image in which a little chicken is displayed, along with red spots that represent the blood that the chicken was loosing. Also, the background of the image (considering that the chicken is the foreground) in not accidental. The wheel on which the accident occurred appears on the right side of Figure 3, whereas a set of swings appear on the left side of Figure 3. As stated above, the chickens went to the carnival in which they could play several games. Swings are a common game in every park in Greece, at which parents take their children to spent time playing.
- *Example 2:* In Figure 4, the mother-chicken appears and so do the little chickens and a door key. The little ones were supposed to be grounded by their mother for being naughty. Thus the key indicates that the mother locked the house door in order to keep the little ones in. The little chickens appearing on the right side of the image, look as if they are talking to each other. According to the young story creators in group A, this image shows the chickens which as discussing their plan of sneaking out of the house. The text above the image says “She took them home and locked them in, so that they wouldn’t be able to go out again. She told them that going out was dangerous”. On Figure 5, only the mother appears. As the children stated, the fact that the little ones and the key are missing, symbolises that they actually managed to unlock the house door, escape their mother’s attention and took the key with them. The text above the image says “She returned home and found out that the little chickens had left again and she said: ‘Sneaky little ones, where did they go this time?’”.

Figure 4 Choosing images – example 2a (group A) (see online version for colours)



Figure 5 Choosing images – example 2b (group A) (see online version for colours)



Another interesting issue for research was the effect of the electronic medium to the students' collaboration. Specifically, the intention was to examine if and how collaboration is facilitated within this activity when a computer is involved. As stated in the previous section, the task was exactly the same for all four groups. All of them had to write their story and illustrate it collaboratively. Thus, it was assumed that they would discuss upon the content of their story and decide which images they were going to use (printed or drawn) and where they were going to be placed. The research data show that the involvement of the computer, especially during the illustration process, triggered and facilitated collaboration. Especially in group A, the students collaborated intensively throughout all the process of creating their story. They discussed upon and decided what the content of the story would be, how the text should be formatted (font, letter size and colour, alignment, etc) and where it would be placed on the pages. They also tried several colours as background of their 'book' and correlated it with several colours for the foreground (text) in order to reach consensus on the better looking combination. The most intense dialogues occurred while choosing images for illustrating their stories. The fact that often one child had objections to the other child's preferences (and vice versa), forced them to raise arguments in order to support their point of view and finally reach consensus, thus concluding on the images to be used and their placement within the page borders. The process of negotiation was usually intense. The following is an indicative example.

- *Example of negotiation:* The children, constituting group A, had a disagreement regarding the mother chicken. Their dialogue occurred as follows:
 - 1 *child A:* we should use the image with the white chicken so that she looks like the chicken in the previous image we used
 - 2 *child B:* but that chicken is not angry
 - 3 *child A:* but she is white
 - 4 *child B:* yes, the other one might be brown, but she gives a very nasty look at the little chicken, because she is rebuking it (child B refers to the image that was finally used and it appears in Figure 6).

Figure 6 Example of choosing an image after a dialogue (group A) (see online version for colours)



The same process was followed by the students in group C too. This was the group which used the computer for illustrating their story. In this case, the students also discussed intensively in order to jointly decide which images they would use and where they would place them. On the contrary, in group D there was none or minimal collaboration. This was the group which was required to create a story, using only paper, markers, crayons, etc. The computer was not involved in the process, at any time. They discussed for a limited amount of time at the beginning of the activity in order to decide on the core axis of their story. Then they divided the labour in two parts and worked independently. Each group member drew a picture which occupied almost a whole page and then wrote (with the assistance of the researcher) a small text on the top side of the page (Figure 7).

Figure 7 A sample from the two-page story of group D (see online version for colours)



In general, the involvement of the computer attracted the children's attention and functioned as a strong motive for extended participation. As described in this section, the computer positively affected the quality of the students' collaboration too. The dialogue among the collaborating students was triggered and sustained significantly because of the

options provided by the computer. Regarding the illustration process, many images were available through the internet for groups A and C, thus initiating negotiations among the group members and facilitated argumentation. Furthermore, the fact that illustration was significantly easier for these groups, as opposed to groups B and D who were required to create drawings, further facilitated creativity. The students spent more time on selecting the proper images and choosing where to place them. This was not feasible for groups B and D, as once a drawing is created, it cannot be moved or resized. Also, as presented in this section, significant effort was put on connecting the illustrations with the text of the story, whereas in the case of group A the images were sometimes complementary to the text.

5 Discussion

The research approach presented in the current paper aimed at examining the effect deriving from involving ICTs in fairy tale creation by kindergarten students. The findings reveal that this effect is significant and positive. The children constituting group A constructed a better fairy tale in many aspects. Their story was bigger, counting number of pages, words and images. The sequencing of their story was more interesting, the plot thicker and the scenery transitions more justified and accurate (Bratitsis et al., 2011). Some of the positive effects of the approach described in this paper are due to the provision of an empty book structure (Bratitsis et al., 2011). This structure was provided electronically through the Tikatok environment and constructed by the researchers for groups B and C.

This paper focused mainly on the effect of the digital medium on qualitative aspects of the students' performance and collaboration. Aspects, such as creativity, imagination and expression of ideas and thoughts, appeared to be facilitated and enhanced by the use of computers. Keeping in mind that ICTs are always an intriguing tool for the children to work with, an increase in motivation was expected. Also the ease of acquiring images from the internet allowed the students to better illustrate their stories, providing an added value to their story. The fact that in group A some images included dialogue using text balloons and operated complementarily to the written text, indicates that the students attempted to proceed to a whole new level of story creating. Also group C negotiated more regarding the illustration of their image, trying to locate images on the internet that would better depict the actions and the overall behaviour of the characters in their stories. The recorded dialogues among the members of groups A and C reveal that their collaboration was intense and fruitful. Especially in the case of group A, the students tried to raise arguments in order to justify their preferences, while negotiating with their collaborators.

At some extend, it is predictable that the groups which used computer images would better illustrate their stories. This can be attributed to the fact that the students who were required to create drawings (groups B and D) probably put more effort in deciding on what to draw and how to do it (colours, size, etc). It is also a fact that children at this age are not able of producing complex and realistic drawings. Consequently, this part of the activity might have been considered as more difficult by the corresponding students and thus, focused on it. Furthermore, children at this age draw often and consider this expression method to be very significant for them and they take a lot of pride of their creations. On the other hand, children in groups A and C had to select the most suitable

out of many available images, thus having time to spare in order to extend their thinking beyond them. As stated above, all the decisions regarding the number of pages and images, as well as the rest of the issues related to the form of the stories, were made by the groups former to the actual creation of their 'books'. Consequently, although group D might have focused on the drawings, considering them more time consuming and complex, the fact remains; the children in group D never considered extending their story as a manuscript or in matters of illustration. With their decisions not being biased at all, this is an indication that the electronic medium operated as a facilitation towards creating richer and better stories. Also, group D was the group which completed the activity in less time than the other three groups.

Finally, the actual plot of the stories and the relation with the children's real life experiences seems interesting, as only group C connected their story with the forthcoming Easter vacations at the time the research was conducted. The others seemed to project personal experiences on their stories. This factor is still under examination and further discussions with the corresponding students are designed.

One significant limitation of the study is the size of the research population. More case studies are necessary in order to generalise the findings of this research. Actually, a more extensive study is in progress at the moment, involving four classes with about 20 children each. Given the significance of story creating as a form of utilising fairy tales in early childhood and early primary education, several aspects are interesting to investigate, mainly focusing on qualitative measurements, involving negotiation and group working in the research design.

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