Play the game in the opening scene
A multidisciplinary lens for understanding (video) ludic movies, including Super Mario Bros., Resident Evil and Scott Pilgrim vs. the World

ABSTRACT
The aim of this article is to create a multidisciplinary tool concerning the passage from the medium of videogames to cinema. According to concepts taken from Media Studies, Cultural Studies, Semiotics and Game Studies, we will explore the multiple dimensions and the related connections that occur in the film linearization of digital interaction: production issues, narrative and aesthetic elements, heuristics and mechanics in-game and on the big screen, and so on. The framework will be tested through three paradigmatic case studies: Super Mario, Resident Evil, and Scott Pilgrim vs. the World. The overall intent is to give scholars, and also practitioners, a holistic perspective on this peculiar type of crossmedia process, pointing out virtuous productive strategies as ruinous ones.

KEYWORDS: ludic movies, Super Mario, Resident Evil, Scott Pilgrim vs. the World, multidisciplinary approach
1. INTRODUCTION

In recent years movies and digital games have become increasingly interconnected. The variety of transposition and influences from both sides has implied a strong plurality of forms and hybridizations. Digital entertainment has become a recurrent example of Hollywood trends only recently; the consequence is a heterogeneous landscape of products with a mixed value, from international co-production like *Scott Pilgrim vs. the World* (2010) to Hollywoodian blockbusters like *Prince of Persia: The Sands of Time* (2010). We could interpret the linearization of the agency enacted by these films as an experiential impoverishment of the *source-game* in terms of ergodic interaction; however, this reverse remediation (Bolter & Grusin, 1999) may offer representational benefits due to the rescued author’s power. Moreover, creation and consumption frames significantly change from medium to medium, sometimes in a radical manner. The point is to understand how this cross-media relation is articulated, taking into account the many variables that occur as a result of a specific transposition. Even if many authors have suggested peculiar analytic ways to set comparisons (Bittanti, 2008), a further challenge is to outline an overall picture of such dialogue, from production to final consumption. Indeed, we believe that cultural meaning comes from the merging of textual, cultural and economic forces. Therefore, in this article we propose a multidisciplinary framework founded upon principles drawn from Semiotics, Cultural Studies, Media Studies and Game Studies in order to draw a holistic picture of the process from videogames to cinema. In order to test and ground this model we present two paradigmatic case studies, each one chosen due to its particular traits: *Super Mario Bros.* (1993), the first major adaptation of a video game and an exemplar flop in terms of revenues and critical reviews; *Resident Evil*, first episode of a successful franchise (2002–2016), inspired by the survival horror games; *Scott Pilgrim vs. the World* (2010), a cult film with a significant nostalgic halo. Our ambition is to provide a multidisciplinary tool for scholars and practitioners across different disciplines and traditions; we aim to improve the understanding of the key factors that occur during the transposition of video games to movies.

2. A HYBRID FRAMEWORK

Cinema and digital games refer both to complex worlds with specific accounts, standards and frames. Moreover, their connections imply further processes and dynamics. How can we completely analyze such a complex type of translation? What are the theoretical and practical drivers to reach this goal in a holistic and satisfying manner? According to the Sociology of Media (Sorice, 2008), the dimensions through which a social researcher can investigate media phenomena are basically threefold: production, text and audience. This assembly represents a good start for dealing with the (video)ludic movies as final output from video games as original source. We intend to extend the second dimension in two further sub-dimensions according to the “ergodic” nature (Aarseth, 1997) of digi-
tal games and their agential and representational issues (Mäyrä, 2008). From a relational perspective between these sides, we embrace the consideration of culture as a fluid battleground: a scenario where different actors and processes dialogue and fight with each other following a bidirectional and non-casual relation (du Gay, Hall, Janes, Mackay, & Negus, 1997). Consequently, power relations are polycentric and difference-based: final users are relatively active in experiencing media and culture, and the success or failure of a production is due to multiple sets of moves and countermoves. According to this assumption, we will adopt criteria without an assumed range of importance. Conversely, their influence must be explored qualitatively depending on the specific game/movie pairing, and we will do exploring the case studies.

In essence, we propose four basic transductional grounds to consider:

1. The production (Hesmondalgh, 2013) of the video game and the related film. This dimension concerns the productive effort in creating and promoting the text (budget available, marketing, actors chosen, etc.) and its ideal target.
2. The agential dimension, with a specific focus on the translation of video game accounts and rules into movie dynamics.
3. The representational dimension, that is the cultural system embodied by the video game/film as symbolic assembly of connotations and influences.
4. The economic and cultural impact of the video game/film (from the box office to the verdicts by specialized press).

Specifically, for the second and third dimensions (strictly textual and interconnected in composing the game world and its coherence; Juul, 2005), we suggest four further operative fronts (or bridges) of comparison:

[n] Narrative: the architecture of meaning set by the story and the characters following a semiotic perspective. As suggested by Greimas (1983) in his “narrative program”, every narration can be visualized as a progression of phases: the contract, when the protagonist knows his mission; the competence, when he prepares himself to accomplish the mission; the performance, the achievement; and the sanction, the judgment on the performance. Moreover, every character in a story can play six different roles called “actants”: the subject (the protagonist, e.g., the hero), the object (the goal to achieve, e.g. the princess to rescue), the sender (who appoints the mission to the subject, e.g., the king), the villain (the main enemy, e.g., the dragon), the helper (who helps the subject in the mission) and the receiver (responsible for the judgment, e.g., the king who rewards the hero). This narrative categorization is useful because it is abstract enough to cross media boundaries and overcome their peculiarities.

[a] Aesthetic: the plastic, figurative (Floch, 2012) and technical features that characterize the product, from colors to art styles and direction adopted to maintain or revolutionize a specific identity. We can expect two main tendencies in picturing and managing the graphic output: the realistic and the iconic.
ones. The first tends to reproduce the reality or a related representation (Bate-
man & Boon, 2006), whereas the second follows abstract and mediated (e.g.,
from the genre itself) styles.

e] Encyclopaedian: the information/symbolic stock that structures the inter-
pretation by the audience. According to Eco (1975), every textual consumption
is localized and connected to other texts (objectively and subjectively related).
In general, our interpretation depends on previous media experiences and on
the context around us. On this front, we analyze the quotes and references
that drive the media consumption both as potential (offering multiple levels of
lecture) and obstacle (generating confusion and misunderstanding if unknown
by the spectators).

d] Dynamic: the relevant mechanics (Adams & Dormans, 2012) and heu-
ristics that characterize the media experience. The former concept concerns the
main rules/logic of the game that can be realistic (trying to reproduce plausible
patterns) and abstract (with a significant autonomy, often genre-based, from
reality). The latter concerns the «rules of thumb that help (. . .) [players] play
the game» (Elias, Garfield, & Gutschera, 2012, p. 29) as much as to say the
best strategies and tactics in order to win the ludic system. In the linearization
into a film these processes can be maintained (e.g., my avatar has to move fast
and his film counterpart does the same thing) or modified (e.g., a stealth game
that becomes an action movie where protagonists constantly shoot everyone).
The reference is again to the “narrative program” described above: what are
the right sequences of action in order to achieve the desired sanction? What are
the working heuristics and the wrong procedures within the game? Does the
movie try to replicate them in its ending or is there a relevant change?

Adopting a parallel analysis between game and film through these categories
and their connections, we will explore the result of a ludic movie according to
two different continuums:

C] Coherence, between the extremes high [C+] and low [C-] and with the
middle point [C/]: this criterion concerns the fidelity of destination-movie to
the source-game. How intensely does the former take its textual and cultural
identity from the latter? Which are the elements of continuity and the factors of
divergence from the original experience?

D] Dependency, between the extremes high [D+] and low [D-] and with
the middle point [D/]: the main question is how much the knowledge of the
source-game is fundamental to understand the destination film: references,
logic and rules typical of the game may represent a plus for fans but, at the same
time, work as a barrier for other audiences without a specific gaming com-
petence. Moreover, their implementation in a different medium can match
perfectly or struggle with its patterns and customs (e.g., a hero who remains
hidden for half the film is not an appealing choice for most viewers).

The positioning of a ludic movie in these continuums is derived from the
dynamic combination between 1, 2, 3 and 4, and a, n, e and d. We must be
careful in judging coherence and dependency; indeed, high positions following such criteria may result in low quality or incomprehensible movies. We consider that a high level of coherence is crucial for engaging players and fans, who may even work as “brand ambassadors”, while a low level of dependency contributes to the spreading of a film to a wider audience. Furthermore, this passage is influenced by the genre ecology of both the texts involved. We can define a genre as a culturally constructed assembly of textual isotopies, or redundancies (Sorice, 2009). It represents a reference frame by which people label and interpret books, movies, digital games, etc. Usually, the translation of a video game into a film entails a relation of genre because it implies proven codes, standardized in production and familiar to audiences, that can be exploited in order to prevent commercial failures and make a profit (Cavaleri, 2010). However, these textual habits can damage innovative instances in favor of an economically secure uniformity. Furthermore, we expect that some video game genres are easier to translate to films than others (e.g., action games rather than puzzle games) according to our criteria. For example, abstract mechanics (typical of products such as Candy Crush Saga) may find difficulties in their modification in linear actions, whereas realistic ones (as in Tomb Raider) involve an almost direct connection to our tangible world. In the former case, a perfect coherence may appear deleterious; on the contrary, in the latter a structural change probably represents a lost opportunity to exploit already existing potential.

The aim of the following paragraphs is to examine these relations with the help of paradigmatic case studies able to problematize and then strengthen our framework.

3. SUPER MARIO BROS.

Super Mario Bros. is a 1993 film directed by Annabel Jankel and Rocky Morton, with Bob Hoskins playing Mario, the famous videogame plumber and Dennis Hopper as King Koopa, the main antagonist. The film costs amounted to an estimated $48 million and the domestic total gross in the USA was $20,915,465,1 making the film a failure in economic terms.

The choice of making a film out of a video game was a big gamble in 1993, considering that Super Mario Bros. was the first real “tie-in” from video games to cinema, but the reasons that led the producers to this risk are almost self-evident: Super Mario was the best known video game hero, with 40 million game copies sold and a Nintendo Entertainment System in the homes of almost 40% of American families. The potential audience was huge, composed primarily of teenagers and families.

In 1993, however, video games and cinema were far from similar media in aesthetic and narrative terms: adapting an 8/16 bit game to a film required a complete re-creation of the environment, considering the stories and the settings of most video games were extremely simple if not absolutely poor.

---

1. Data retrieved from [http://www.boxofficemojo.com/movies/?id=supermariobros.htm](http://www.boxofficemojo.com/movies/?id=supermariobros.htm)
3.1 GAME SOURCE

*Super Mario* is a mostly horizontal scrolling platform game set in a fantasy world where the hero, a plumber, has to rescue his beloved, who is actually the princess of the Mushroom Kingdom (the object of value). The girl was kidnapped by Bowser, a giant spitfire turtle and king of Koopa turtles, aimed to conquer her land [n]. This setting is both simple and absurd. It is acceptable as a fairy tale, which does not need to be realistic to be engaging. Moreover, it works for the medium because of the predominance of game aspects over narrative ones in the platform genre. Following this fantastical attitude and the technical possibilities of that period, the aesthetics [a] embrace an iconic approach.

On the agential dimension, there were some peculiar aspects of *Super Mario Bros.* – and video games in general – that were well known to audiences and have become part of our cultural background [e]: concepts such as life-up, power-up, bonus, and coins are part of Super Mario Bros. as much as the characters and platforms, so it would have been wise to consider them during the adaptation. Moreover, the competence [d] required of Super Mario and the player is strictly physical in terms of jumping, timing and agility.

3.2 DESTINATION FILM

Conversely, in adapting *Super Mario Bros.*, screenwriters Parker Bennett, Terry Runte and Ed Solomon tried to re-interpret some main concepts, including Mario’s job as a plumber, the mushrooms as characters, and the jumping actions, making them cinematographically credible and appealing. The overall result [n-a] set the film between New York and a parallel cyberpunk universe which is reached through the sewers; Mario was described as a New York plumber; Luigi, his brother, as a young man without his typical moustache; Princess Peach became Daisy and she falls in love with Luigi instead of Mario; the turtles, which were the typical basic villains in the game, were substituted for anthropomorphic dinosaurs. Moreover, both the dinosaurs and the mushrooms were the consequences of a “de-evolution” machine, and the object of value is a stonethat has the ability to merge the two dimensions, coveted by all characters (Koopa wants it in order to conquer the real world, Mario and Luigi with the aim of stopping him): thus, the narrative program totally changes. Aesthetically [a], neither characters (with the exception of Mario) nor locations have a connection to the source: the cartoon-like aspect of *Super Mario Bros.* gets lost in the dark cyberpunk rendering adopted for the film. Even the typical red/blue and green/blue outfits of the main characters appear late in the story, limiting themselves to quoting the source text rather than identifying the characters from the beginning (as it occurs in the video game). The film assumed an “adult aura” and created a narrative universe inconsistent with the source but, at the same time, it did not reach its autonomy as a film. The references to the game such as names, helpers and gadgets seem to be extemporaneous nonsense that problematize and weigh down the overall media experience.
Furthermore, the dynamics of the movie [d] are distant from their counterparts in the video game: Mario and Luigi overcome challenges with humor, smart ideas and plumbing skills (also [d] become realistic), and the act of “jumping” appears only as a “tribute”. In the end, we have a low coherence [C-] (the modifications are significant) but a relevant dependency [D/] (several elements from the game work as filter and barrier for general audiences). To sum up, Super Mario Bros. the film is actually a dystopic cyberpunk story that could have even benefited from eliminating the restrictions imposed on it by being an adaptation: according to its plot and dynamics, there was no need for the characters to be Mario, Luigi, Peach or Bowser. Furthermore, eliminating explicit references to the video game, the audience would have had no chance to see the connection with the source game.

4. RESIDENT EVIL
The success of the Resident Evil saga (2002-2016) has both put forth Paul W.S. Anderson as a mainstream action director and also established him as the foremost name in realizing video games adaptations. Anderson had already directed Mortal Kombat (1995), a film that gained some success with audiences and was the first attempt to mediate in a thoughtful way between game and film specificities. With a production budget of $33 million and global grosses of $102,441,078\(^2\), the first Resident Evil (2002) is one of the most successful videogame adaptations in cinema history, which was followed by four profitable sequels and has another currently in development. The action-horror genre associated with the film contributed to a marketing campaign that addressed a teen and adult movie audience that referred to videogame fans as an element of the general film target – the videogame was not even cited in US official trailers, except for the billing. Resident Evil was born as a successful videogame and has grown into a trans-media franchise, composed of videogames, films, books, comics, and cartoons. Choosing to focus on a new character for the film gave the producers the opportunity to create a new narrative branch, almost autonomous from the original saga.

4.1 GAME SOURCE
Resident Evil (1996) [n] tells the story of agents Chris Redfield or Jill Valentine (it was possible to choose the main character), members of Raccoon City Special Investigation staff. The agents are investigating some strange deaths in the woods near the city. The inquiry leads them to a mansion where a virus has transformed all the inhabitants into zombies. They subsequently discover that the building is the entrance to a secret laboratory where biological weapons have gone out of control. The player’s mission is to survive the horror and escape alive, handling limited provisions of ammo and medical kits.

Times had changed from the 1980s and the videogame dynamics of Super Mario Bros. The technical improvements of PC and game consoles allowed

---

developers to move from two-dimensional aesthetics to polygonal graphics and the simulation of the three dimensions. This leap represents a major turning point and the true reason why games started to look similar to cinema in technical and expressive terms: the introduction of the third axis assimilates the frames and the possible movements through game spaces to those of a movie camera. Consequently, developers, faced with this new world, plundered its techniques, introducing in-game overviews, subjective viewpoints, tracking, zooms, even visual aberrations such as “lens flare”, to recall a cinematic appeal. *Resident Evil* series followed this technical and productive approach [a], and went beyond: its chapters re-mediated the cinematographic genres, developing forms never seen before in any of the two media. *Resident Evil* is the first representative of a type of game that takes the name of “Survival Horror”, borrowing from the cinema genre’s setting and sense of suspense, surprise and tension to generate innovative strategies [e] in videogame form in which the action is always restrained by the need to preserve health and ammunition [d].

### 4.2 DESTINATION FILM

By the time Anderson took on the task of making a movie out of the videogame franchise, the saga had already developed its own strong fictional universe, with well-defined characters, established topical events, and a detailed plot. The director then chose to draw inspiration from the video game to create a film – later to become the founder of a narration [n] that involved again Anderson on the fourth and fifth episodes – that differs profoundly from the original product, retaining only a few elements and shaping the story around a new character, Alice, played by Milla Jovovich. From a point of view that is consistent with the original product, Anderson’s operation is questionable. Conversely, the result had the merit of recognizing to the film its own autonomy and consistency, which allowed it to be successful even among audiences who had no familiarity with the game (Morris 2012).

The cinematic saga of *Resident Evil*, though intended to proceed along a separate path from the videogames, continued to resume narrative elements so that it can be considered as a sort of parallel universe (the main opponent, the Umbrella Corporation, remains, as well as the narrative program based on a tragic gateway) in its own right, whose fortunes no longer have a direct link with the logic of loyalty to the video game.

The film’s aesthetics [a] matches perfectly with those of the original games in their dark and black-saturated atmospheres, probably influenced by the zombie films of George A. Romero. Moreover, while there are several references to the videogame in graphical (character design, locations design, monsters design) and encyclopedian terms (names of characters and monsters, references to Umbrella Corp., a storyline that refers to both the first and second iterations of the video game), the cultural system [e] is independent and the references are secondary because they are transversal and already known. Indeed, the popu-
lar cinematic genre of the horror film previously inspired the videogame, and this facilitated its conversion into a film (for example, a mansion with a hidden laboratory is not a particularly original setting for a horror product). Instead, dynamics [d] work specifically according to the source game: strong, encroaching enemies and an emphasis on escape and dealing with the scarcity of resources in a semi-realistic environment. This mechanic is increasingly present as a cinematic theme because it strengthens the feeling of anxiety and tension through its fusion of action-movies rules. As a whole, the directional relationships between film-video and game-film has added new mechanics to the first medium, able to enrich its expressive potential and enlarge its audiences.

In conclusion, Resident Evil is highly coherent [C+] with the video game: the narration is mirrored, aesthetics and dynamics are similar, and only the cultural system is less specific because it is already shared. Aside from that, the dependency of the film is low [D−] because it balanced the connections to the game (present but ancillary) with the more diffuse and reassured horror genre background, avoiding possible problems of accessibility. Finally, though crucially, the attention to the agential dimension of the Resident Evil saga and the fidelity to its semi-realistic approach has fostered an innovative referentiality toward other horror movies.

5. SCOTT PILGRIM VS THE WORLD

Scott Pilgrim vs the World is an unusual film, a true experiment in creating a syncretic language that merges cinema, graphic and videogame aspects. Based on the series of graphic novels by Bryan Lee O’Malley, Scott Pilgrim vs the World was distributed in 2010 by Universal Pictures. Its theatrical release results were not remarkable: considering a production budget of $60 million, it grossed a total of $47,664,559 worldwide\(^3\), even if both critics and comic fans expressed good reactions to the film.

Despite Universal Pictures’ planned wide release in North America, the failure can be partly considered as the result of a flawed marketing plan which promoted Scott Pilgrim vs. the World as a kids/teen film – in Italy the film lasted one week of evening screenings, reduced to afternoon screenings almost exclusively starting from the second week. The film itself, just as the graphic novels, is a hymn to ’80s pop culture with a potential audience composed of 20-40 year old males. Instead of planning a wide release, it would have been useful to proceed with a more target-oriented release schedule and a promotion campaign focused on college and university students. It would probably have been a good idea to stress and even promote the link with the graphic novels. The film was revived through home entertainment platforms, achieving the aura of a cult film (Tyler, 2010).

5.1 GAME SOURCE

Scott Pilgrim vs the World is an atypical, yet useful, example for this essay, considering that its source is not a video game, but instead a series of graphic novels

\(^3\) Data retrieved from http://www.boxofficemojo.com/movies/?id=scottpilgrim.htm
that uses videogame level design and aesthetics to build its narrative and visual structures. The original novels (O’Malley, 2004–2010) can be read as a tribute to digital ludic architecture, nerd pride, and the entire ’90s game (and nerd) culture: the novels’ progression is through [e] levels, power-ups and boss-fights, and references to cults like The Legend of Zelda (e.g., the Tri-Force) and Super Mario (e.g., the one-up) are frequent. The story [n], set in present-day Toronto, involves a boy (the hero, Scott Pilgrim) who, in order to date a beautiful girl (Ramona, the object of value) fights her ex-boyfriends (the opponents). He reaches this goal using [d] his deep knowledge of game culture itself and its related mechanisms (the same fictional universe partially follows gaming rules such as hero/player supremacy and additional lives), and self-respect as opposed to prejudice about nerds: in other words, a mainly abstract but for someone culturally based (and then tangible) competence. In the end, the aesthetics [a] of the comic is a mix between Western and Eastern tradition with a realistic setting. Together with the film, Ubisoft released a video game for PlayStation Network and Xbox Live, Scott Pilgrim vs. the World: The Game, that borrows its appearance from the comics and expands the mechanics to a scrolling beat’em up with RPG elements, becoming a sort of link between comics and film (e.g., Scott’s head in the game is derived from the comics and it appears in the film in the form of a bonus life icon exactly as it is in the game [a]).

5.2 DESTINATION FILM

The film is a faithful portrait of the comic, produced while O’Malley was finishing the sixth and final volume of the series. The plot [n] is a recap of the wider story described in the source, but it maintains every actant role. In addition, the encyclopedia [e] and the dynamics [d] literally trace the original ones, presenting redundant references to game culture, periodic boss-fights, mechanisms from several digital entertainment genres (from music games to beat’em ups), succeeding in acting as a sort of gamification within the filmic boundaries. The protagonist moves and fights in an unrealistic manner, acknowledging the traditional avatar status that is usually superior to other virtual entities. Aesthetics [a] honour the comic origin with a realistic but peculiar style: for instance, the subdivision of the film’s sequences as chapters and some special effects that reproduces the previous medium (e.g., cartoon bubbles) are evidence of this. Moreover, the graphical outcome also relies on further effects that reproduce gaming ones (explosions of coins, power ups, interfaces, electronic voice comments, etc.), enforcing the cultural orientation of the encyclopedian dimension [e].

The explicit adoption of the video game as the main grammar of a different medium (comics as well as films) is preserved. The perspective of the protagonist is a meta one because his cultural background allows him to understand the world and its elements: the reader model is the hero himself, a passionate gamer. Thus, the coherence results high [C+] as the dependency [D+], not in relation to the comics themselves (it would be [D-]) but rather to their cultural
frame: the triumph of a peculiar game culture, relatively popular and vintage (the pixel art is often a matter of style and the arcade era is a cultural memory only for a certain type of spectator), is a gift for long-time gamers but a problem for new audiences. Furthermore, the marketing was directed to target a market that was too young to understand quotes and references to a gaming era older than their own. The short period of the theatrical release also worked against a film that only reached its potential once it was released for home viewing, by which point word of mouth could correct the effects of a poorly focused international marketing campaign.

6. CONCLUSIONS
As a preliminary consideration to these conclusive remarks, the ultimate goal of this work is not to provide metrics for identifying a good quality movie, but rather to suggest guidelines for determining the effectiveness of an operation of cross-media adaptation from digital games to films. In these terms, we believe that such criteria are consistent with the analysis of any translation from an interactive medium to a linear one. A result of the study is the recognition of certain determinants concerning the economic outcome from media translation and the promotional strategy to mediate between model spectator and generic spectator. Consequently, the output of our analysis should work as the basis of a wider model applicable on an economic and cultural level; it suggests an analytic consciousness that, if applied in advance, would allow for reasonable predictions about the chances of success for films derived from gaming sources.

As explained in the introduction, we wanted to provide an overview, summarizing guidelines and frames for the interpretation of an extended number of case studies. We focused on a holistic picture of the transition from an interactive audio-visual form to a linear audio-visual one, an operation that inevitably led to limited attention being granted to specific aspects, such as aesthetics, and does not have the final word on debates of fidelity regarding coherence and dependency (improvable with other disciplines and perspectives such as audience studies and adaptation theory). However, our hope is that, from these premises, further research may arise and deepen specific aspects in order to achieve a greater level of detail and accuracy.
REFERENCES


Candy Crush Saga, King, United Kingdom, 2012.


Resident Evil, Capcom, Japan, 1996-2014.

Scott Pilgrim Vs. the World: the Game, Ubisoft Montreal, Ubisoft Chengdu, Canada, China, 2010.


Super Mario, Nintendo EAD, Japan, 1985-2013.


Tomb Raider, Core Design, Crystal Dynamics, United Kingdom, USA, 1996-2014.


Wright, E. (2010). Scott Pilgrim Vs. the World [movie]

AUTHOR CONTACTS

Enrico Gandolfi – Egandol@kent.edu
Roberto Semprebene – rsemprebene@luiss.it