

Social Mexica: A computer model for social norms in narratives

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Abstract

Several models for automatic storytelling represent social norms by embedding into their structures social knowledge. In contrast, this model explicitly describes computational structures to represent knowledge related to social norms, mechanisms to identify when a social norm is broken within a narrative and a set of constraints and filters to employ such social knowledge during the narrative generation process. An implementation of the model employing MEXICA, an automatic storyteller based on the Engagement-Reflection creativity model, as source of story plots is presented. Lastly, the results of a survey are presented as a preliminary evaluation of the model.

Introduction

The study of automatic storytelling has served for several purposes: e.g. to cast light on how human creativity works, to identify which cognitive processes are involved, and so on. However, studies about how social knowledge can be explicitly represented and employed during plot generation is mostly absent among the current systems.

A social norm is defined as a general expected behavior with social relevance inside a social group (Durkheim, 1982; Sherif, 1936); when the norm is broken the group sanctions the person responsible of it (e.g. social rejection).

We are interested in studying how social norms can be exploited in the context of plot generation. We have the following hypothesis:

The rupture of a social norm allows the development of an interesting and novel narrative. Nevertheless, a system that action after action breaks social norms may produce incoherent and uninteresting narratives (Pérez y Pérez, et.al. 2011).

In this way, social knowledge is relevant for the storytelling generation process because it provides valuable information to ensure and evaluate aspects such as coherence, novelty and interestingness of a narrative. The rupture of a social norm may increase the tension of a story making it more interesting, but the abuse of this resource, may affect the coherence and overall quality of the generated narratives. When a story hero breaks a social norm, the novelty

may increase; nevertheless, if this strategy is presented several times, the result may be the opposite.

Automatic storytellers, such as Daydreamer (Mueller 1990), MEXICA (Pérez y Pérez 1999), or Fabulist (Riedl 2004), includes tacit social knowledge as part of their general structures. Sometimes, this knowledge is represented as action's preconditions to prevent the inclusion of incoherent material. In other cases, this information is hardcoded. However, none of these systems detect when a social norm has been broken neither take advantage of this information during plot generation.

The purpose of this work is to provide our plot generator, MEXICA, with the capacity to employ social knowledge. Thus, we have developed mechanisms to extract social norms from inspiring stories, detecting the rupture of social norms and for taking advantage of this information during plot generation to improve the interestingness of the story in progress.

Previous work

Thespian (Si 2005), *Comme il Faut* (McCoy 2010) and Mimesis (Harrell 2012) are examples of computer models that include social knowledge into their structures. In this section, the procedures employed by each of the previously depicted systems to create narratives, and the structures employed to represent social knowledge, are briefly reviewed.

Thespian is a system to create interactive narratives in a 3D world. One of the characters, handled by a human, travels through an environment interacting with other available characters. Each character has goals to accomplish, and known facts that conform his state. To fulfill a goal, dynamic functions, which alter the state of the characters, are employed. Thespian describes a model for social norms that guides the conversation between characters. The social norms described in this model serve the purpose of conducting a conversation, thus, a social norm is broken only when the expected conversation flow is broken.

Comme il Faut is a playable computer model of social interactions that provides a set of characters with the ability to interact between them inside a virtual world. Every game starts by defining the characters (traits, basic needs, relations with other characters...) and the set of known

facts inside the virtual world. Every character additionally has a set of goals to fulfill during the game. At the beginning, all the goals are pondered, and one of them is selected to start. A social interaction is then depicted to satisfy the selected goal. Every social interaction has linked a set of possible results. Once a social interaction is performed, one of these results is selected relying on the available information of the world and the characters involved in the interaction. Finally, a new goal from one of the characters is selected and the process moves on until a predefined game goal is accomplished.

This model contemplates social norms inside their knowledge structures in the form of rules (if exists a romantic relation between characters x and y , then x can start dating y). These rules are manually defined by the model designer and its contexts are sometimes not flexible to comprise different scenarios.

Mimesis is a system for interactive narratives which explores the social phenomena of discrimination by employing games and social networks. The system provides with mechanisms to create characters based on the musical preferences of the player, which are retrieved from the information available in social networks. From this information, a set of attitudes are assigned to the character. The system further employs this information to retrieve social aggressions that are presented to the user as gestures in the character or as textual information.

Despite these systems consider the inclusion of social knowledge their approaches still invite contention because of the lack of mechanisms to determine the rupture of social norms. Additionally, mechanisms to automatically incorporate new social norms should be developed, and their constrained potential to use social knowledge during the story generation process can be improved as well.

Model description

This paper describes a computer model for representing social norms, detecting their rupture and providing guidelines during plot generation to improve the interestingness of the story in progress.

As mentioned earlier, a social norm is defined as a general expected behavior with social relevance inside a social group, and its rupture generates a sanction against the action performer.

From all the expected behaviors present inside a social group, some of them are irrelevant to the group. Breathing is an expected behavior, but has no relevance inside a narrative. On the other hand, not preserving the life of a person is relevant to a social group because it jeopardizes their welfare. In this case a social norm arises to preserve the well-being inside the group.

The concept of welfare preservation has multiple interpretations depending of the social group. Some definitions include terms such as happiness, health and prosperity, all of them terms with certain degree of subjectivity. In this work, the rupture of a social norm is delineated in terms of two premises. The first considers learning mechanisms to identify the relevant elements of scenarios where a rupture of a social norm occurs. The second is based upon the following premise:

A social norm is broken when an action unjustifiably jeopardizes the welfare of a social group.

On grounds of previous studies of social knowledge (Echebarria 1993; Durkheim, Cosman and Cladis 2001), a mechanism to learn social procedures is based on the recognition of the elements present when an action triggers a punishment from a social group against the action performer. The set of these detected elements shapes the context where the action occurred. The first mechanism to identify the rupture of a social norm is based on the detection and representation of such contexts, called social contexts, and its further identification inside a narrative.

The second mechanism employs the concepts of welfare and justified action. To represent the welfare of a social group, the model can be configured with a set of behaviors considered as disturbances of such state. This element provides flexibility to the model and allows the user to determine when the welfare of a social group is threatened.

The concept of justified action is built upon crime and social norms theory (Nieves 2010). These theories contend that the aggressor rights loose relevance in contrast to the defender rights. Based on this idea, the following premise is stated:

Within a story, an action that threatens the welfare of a social group is justified if, previously during the story, the action receiver had originated a welfare threaten of equal or lower intensity against the action performer.

There are different kinds of social norms employed inside narratives. Certain norms intend to preserve the cohesion inside a social group (a social norm that upholds an initiation ritual serves this purpose), others preserve different values for a group. The scope of our model of social norms is bounded to those that can be represented with a social context and that intend to preserve the welfare within a social group.

This model consists of three parts. The first, called narrative model, presents the required elements to represent a narrative. The second, called social groups' representation, introduces the basic elements to provide the system with social groups. The last, called social norms' model, com-

prises the components employed to identify, represent and employ social norms during the story generation process.

Narrative model

Our model obtains its knowledge structures from MEXICA (Pérez y Pérez and Sharples 2001; Pérez y Pérez 2007) an automatic storyteller. For this reason, this system is explained in the following section.

MEXICA

This storyteller represents the writing process as a succession of two cycles. During the first of them, called engagement, the writer focuses his efforts on producing novel related ideas guided by several constraints, and transforming them into text. On the other hand, the reflection cycle presents a retrospective stage where the agent analyses de produced material, explores feasible modifications, transforms the text, and finally, triggers new constraints that will be employed in future iterations of the process.

MEXICA employs several knowledge structures to implement this creativity model. An actions' library, an inspiring set of stories, and a group of characters and locations available in the system (see Table 1 for the list of available characters).

The actions' library serves as a repository for the basic building blocks of a story, the primitive actions. Each primitive action consists of an action name and the following sets: characters, preconditions and post conditions.

Tlatoani(T)
Prince(P)
Princess(Ps)
Priest(Pt)
Eagle and Jaguar Knights(EJ, JK)
Fisherman(Fs)
Virgin(V)
Slave(S)
Hunter(H)
Lady(L)
Enemy(E)
Trader(Tr)
Warrior(W)
Farmer(F)
Artist(A)

Table 1: Available characters in MEXICA.

The preconditions and post conditions are both samples of relations between characters. The available relations are of two types: emotional links and tensions. Emotional links represent affective reactions between characters. Each link consists of the following elements: type, valence and intensity. The type can be love or friendship between characters, the valence can be positive or negative, and the intensity is an integer number between the range [0, 3]. Tensions represent conflicts between characters, and consist of state (active -on- or inactive -off-) and type. A list with all the relations is shown in Table 2.

Emotional links	Tensions
Love	Actor dead (Ad)
Friendship	Life at risk (Lr)
	Health at risk (Hr)
	Prisoner (Pr)
	Clashing emotions (Ce)
	Love competition (Lc)
	Potential danger (Pd)

Table 2: Available relations between characters in MEXICA.

Figure 3 shows graphical representations for each type of relation between characters. An emotional friendship relation (upper left) is represented by a continuous line with the valence and intensity at the top. An emotional love relation (lower left) is represented by a dotted line with the valence and intensity at the top. A tension between two characters (right) is represented by a saw tooth linking two characters and the abbreviation of the tension type.

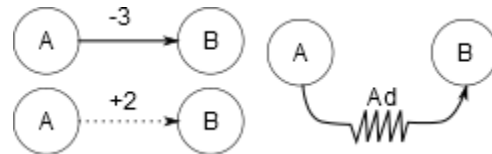


Figure 3: Graphical representation of the relations between characters.

In MEXICA, a story is presented as an ordered sequence of actions. Each story has a knowledge structure associated, called story-context, where all the known facts in the story are registered. Every time an action is performed this story-context is updated.

Another knowledge structure is the inspiring set of stories, which consists of multiple stories created by humans representing well-formed narratives. These stories are written on the same format as a regular story generated by MEXICA, as action sequences.

Each inspiring story is analyzed to create additional computer structures called contextual structures. A contextual structure is a generalization of each story-context obtained by analyzing an inspiring story. They represent a situation that happened in the analyzed story. Each structure has associated a set of actions that can be performed if a similar situation occurs in a new story.

The generalization process for a context consists in the replacement of each character with a variable. Every time a story context is generalized, the next action in the story is generalized as well, and added to the list of following actions of the generated contextual structure.

Story generation process

To create a story in MEXICA, an initial action is instantiated, and added to a new story. Each engagement step initiates by obtaining a list of feasible following actions.

For this purpose, the context of the current story is generalized and compared against each of the available contextual structures. The similar structures are then filtered by a group of constraints activated during the reflective step. Then, the first is selected, and one of its following actions is instantiated and added to the story. A new engagement step begins until the maximum number of actions is reached. If there are no remaining contextual structures after the filtering process, an impasse is declared and a reflection cycle begins.

Each reflective step initiates by determining the unsatisfied preconditions of each action in the story. When a precondition is not equivalent to a relation inside the story context, is called unsatisfied. To solve this problem, a new action with an equivalent post condition is instantiated and added to the story just before the analyzed action. When every single precondition of one action is satisfied, the next action in the story is analyzed.

A story finishes when one of the following criteria is fulfilled: all the characters in the story are dead, a declared impasse couldn't be solved, or the maximum number of actions for a story is reached.

Social groups' representation

The original version of MEXICA doesn't contemplate structures that represent social groups. Its representation is relevant to the model because they constraint the scope of a social norm, and establish relations between the characters that allows the system to identify their ruptures.

In this work, every group consists of an ordered set of hierarchies. A hierarchy is a set of characters, and has a numeric value associated, called level, which is employed to prioritize it inside a group.

Table 4 shows the basic groups inside the model. They are defined by the user in a text file, so new collections can be added to the implementation. The only constraint is to maintain at least two basic components: one for the gender structure and other for the social structure of the characters. These two groups are relevant for the system since social and gender relations are often important to determine if a social rupture occurred.

Social		
Hierarchy	Level	Characters
Nobility	5	Tlatoani, Priest
High Society	4	Prince, Princess
Fighters	3	Eagle and Jaguar knights, Warrior
Workers	2	Farmer, Fisherman, Artist, Lady, Virgin, Hunter, Trader
Low society	1	Enemy, Slave

Gender		
Hierarchy	Level	Characters
Male	2	Tlatoani, Priest, Prince, Eagle and Jaguar knights, Farmer, Fisherman, Artist, Hunter, Enemy, Slave, Trader, Warrior
Female	1	Princess, Lady, Virgin

Table 4: Social groups inside the model.

Social norms' model

In this research we employ social relations, actions and contextual structures to represent norms.

Social relations

A social relation represents the awareness of the rupture of a norm inside a story. Our system works with two types: emotions and tensions. Emotional links represent reactions between characters due to an action with social concern. Each one consists of the following elements: type, sign and intensity. The current implementation only includes one type known as social acceptance between characters; the sign can be positive or negative; and the intensity is an integer number between the range [0, 3]. Tensions represent conflicts due to a norm breakage, and they consist of state (active or inactive) and type. Table 5 displays the available relations.

Emotional links	Tensions
Social acceptance	Social disobedience (Sd) Social burden (Sb) Social threat (St) Social clashing emotions (Sce)

Table 5: Additional social relations between characters for the model.

Social actions

Social actions (s-actions) are employed to emphasize the presence of a socially relevant action inside a story. For instance, the fragment of story presented in Table 6 shows an s-action (in bold) employed to highlight that presence of a social rupture.

The hunter hated the jaguar knight. The hunter attacked the jaguar night. The jaguar knight ran away. The jaguar knight was a coward fighter. ...
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Table 6: Fragment of story presenting an s-action

When an s-action is appended to a story, it serves for adding social relations to the story context and to emphasize the rupture of a social norm; on the other hand, when s-actions are employed in an inspiring story, they serve as markers for social contexts where a rupture has occurred. These actions present evaluative clauses as part of their

associated texts. These clauses can be employed to incorporate author values and valid norms to the story text.

Each social action consists of an action name, a set of characters, a set of associated texts, a post condition, and its relations. The post condition of a social action consists of a social tension and its mode: insert, remove, or justify. The socially relevant character attribute can have one of the following values: Performer, Receiver, None, Both. The socially relevant relation attribute can have one of the following values: Gender, Social, None, Both.

The socially relevant elements of these actions are employed during the story context generalization process to represent the elements of the story context that reflect the rupture of a social norm (see the following section for a detailed description of these elements).

Action name: acted against Mexicas' will with
Character variables: A B
Post condition: insert social rejection towards A
Socially relevant character: Receiver
Socially relevant relation: None

Table 7: Example of a social action.

Table 7 presents a social action employed to emphasize the rupture of a social norm by a character when he acts against the Mexicas' customs. The effect of this action is to attach a social rejection link against the action performer from every character aware of the rupture.

Social contextual structures

Social contextual structures, which are similar to those employed by MEXICA during the engagement phase, are built to generalize social contexts. They consist of a social context, and a reference to the social action that engendered it. Their generation process initiates by generating the context. This is obtained by generalizing the story context when a social action is found inside an inspiring story. The process consists in the replacement of each character with a variable representing it. This process is constrained by the socially relevant character attribute of the social action.

When the socially relevant character attribute of a social action is set to 'Performer' or 'Receiver', that character is not generalized; if is set to 'Both', none of the characters are generalized; if is set to 'None', both characters are generalized. When the socially relevant relation attribute of a social action is set to 'Gender' or 'Social', the distance between the hierarchies of the characters is stored.

Once the social context has been obtained, every emotional link that does not involve both of the social action's characters is removed. In the same way, every tension that does

not involve any of these characters is banned. Finally, the removed tensions are retained as part of the context. Finally, the social action detected is linked to the social contextual structure.

The artist was friend of the prince.
The enemy had an accident.
The artist realized the enemy had an accident.
The artist cured the enemy.
The artist acted against Mexica's will with the enemy.
...

Table 8: Example of a partial story.

Table 8 presents a partial story conformed by four actions and one social action (in bold). Once these actions have been added to the plot, the story-context in Figure 9 is created. In this, the tension *Hr* (health at risk) is marked with a slash to represent that was removed from the story context with the action "The artist cured the enemy". Additionally, a social emotion (represented by alternated short and long line segments) from the prince towards the artist has been added due to the identification of a social rupture on the fourth action of the story. This rupture was originated because the artist acted against the Mexica's will by rewarding the enemy.

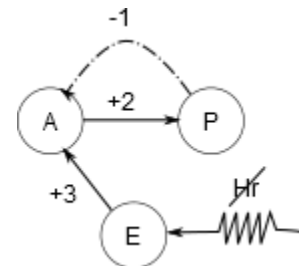


Figure 9: Story-context for the story in Table 8.

From this context, the social contextual structure in Figure 10 is obtained. Inside its context, character variables are represented by upper-case letters, and non-generalized characters are presented with the prefix 'c'.

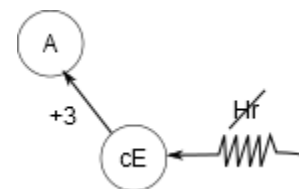


Figure 10: Social contextual structure obtained from the context in Figure 9: Story-context for the story in Table 8.

In our example, only one of the characters of the context was replaced by a variable (the artist), since the social action employed (see Table 7) marked the action receiver as a socially relevant character. Also the relations from and to the prince were banned since he was not part of the social action. This context represents a social rule condemning

positive emotional links from the enemy, even if he is in danger.

Rupture of social norms

Our model presents two mechanisms to determine when a social relation is added to the story context. The first looks up specific relations between the characters inside the story context, and, if present, a social relation is triggered. The second looks for social contexts inside the story context and appends the social relation linked to it.

Regarding to the first mechanism, the social emotional link with negative valence is triggered when a character breaks a norm. This link represents social rejection. The same link with positive valence appears when a character performs an action that removes a tension from the story context. These links go from each character that identifies the rupture towards the action performer.

If several emotional links with the same valence but different intensities exist, only the one with the highest absolute intensity remains and the rest are removed. If several emotional links with different valences exist, the social clashing emotions tension is triggered, which represents ambivalent feelings towards a character.

A tension of social disobedience is triggered when a character in a lower social level breaks a social norm against another character in a higher level. A tension of social burden represents malpractices from a character in a higher social level against another character. A tension of social threat identifies a character that has broken norms several times, or has broken an intense norm. The second mechanism is explained in detail during the section related to the rupture of norms.

Mechanisms to identify social ruptures

Two processes are proposed to identify when a social norm is broken inside a story. The first is based on the hypothesis presented to identify a threat to the welfare of a social group. The second consists in the identification inside the story context of any learned social context.

Regards the first process, it is introduced into the system the tensions *Lr*, *Hr*, *Pr* and *Ad*, considered to alter the wellbeing of a social group. The first three tensions are called tensions with moderate social relevance; the last is called tension with intense social relevance.

When a tension with social relevance is unjustifiably triggered inside a story, a social norm is considered to be broken. An action that triggered a moderate or intense tension

is justified when, previously in the story, at least one of these two facts stands:

- Another tension was triggered against the action performer (such as in self-defense).
- Another tension was triggered against any positively linked character to the action performer, by the action receiver (as in the case of a father defending his child).

A character is said to be positively linked to another character when, inside the story context, an emotional link with positive valence exist between them.

A justified action is exemplified by the following actions. The princess was sister of the prince. The tlatoani hated the prince and decided to attack him. The last action (the tlatoani decided to attack the prince) causes the prince's health to be at risk, which is a moderate tension. Since previously in the story, no equivalent tension had been triggered, the action breaks a social norm. If the action, the princess attacked back to the tlatoani causing his death, is added to the example, it is justified. This is because, even when it originated an intense tension (a character was death), this tension is justified by the previous action of the tlatoani and because the princess is positively linked to the prince.

The second process to identify a threat to the welfare employs the contextual structures stored. It initiates by analyzing the story context once an action is added to the story. If a social contextual structure, whose context is included inside the story context is detected, the last action in the story is marked as socially relevant. If a justifiable relation to the post condition of the social contextual structure is present inside the story context, the action is marked as justified; otherwise, the action is marked as unjustified. A relation justifies another if it is of the same type, its sign is equal, and its intensity is equal or lower.

When an action is unjustified, the post condition of the social contextual structure, which triggered such state, is instantiated with the action characters, and added to the story context. This social link emphasizes the rupture of the social norm just detected. If the action is marked as justified or normal, no additional relations are added to the context.

Relevance of social norms

A story that presents low levels of tension usually focuses on introducing relations between characters or non-relevant actions, such as location changes. These stories frequently become boring due to the lack of remarkable actions. In Table 11, an example of such type of stories generated by the model is presented.

The inclusion of tensions inside a story according to the Aristotelian tension curve gears into the generation of interesting and coherent stories. Nevertheless, some of the knowledge structures generated by MEXICA, such as contextual structures, still lack of enough information, such as social relations, which originates inconsistencies in the generated stories.

The artist went to Texcoco lake with the lady.
 The virgin followed the artist.
 The virgin admired and respected the artist.
 The artist went to Tlatelolco market.
 The lady found by accident the artist.
 The artist was brother of the lady.

Table 11: Story plot with low levels of tension generated by the model.

The jaguar knight went hunting with the tlatoani.
 The fisherman hated the tlatoani.
 The fisherman attacked the tlatoani.
 The tlatoani attacked the fisherman.
 The jaguar knight made prisoner the fisherman.

Table 12: Sample story generated by the implementation of the model.

In Figure 13, the story context on the left was generated without employing the model after the third action of the story in Table 12. The story context on the right was generated employing the model on the same scenario. The contextual structure generated from the first context contains the same relations between the characters, but replacing them with the variables A and B. When this structure is employed for the generation of a new story, both characters are indistinguishable, since they have the same relations. The following action associated to the contextual structure is “C made prisoner A”, but since either of the characters can be selected, in a story where this contextual structure is selected, the tlatoani can be sent to jail.

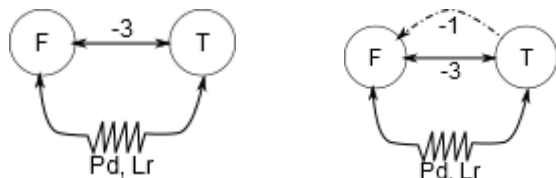


Figure 13: Story contexts from a story.

This last example states an important difference when employing the model of social norms. The problem introduced can be disentangled by the inclusion of a social relation towards the Fisherman, which was the character who broke a social norm.

The fisherman was friend of the princess.
 The princess went to Texcoco lake with the fisherman.
 The princess had an accident.
 The artist realized that the princess had an accident.
 The artist did not cure the princess.
 The princess, in a sacrifice ritual, ended up with her life.

Table 14: Story with few social norms broken generated by the implementation of the model.

Testing the Model

We employed a questionnaire to cast light on how the model’s implementation serves the purpose of generating more interesting narratives. For this purpose, three stories were presented to a group of forty people with at least a bachelor degree (in progress or concluded). The first story (presented in Table 11) was presented with the purpose of representing a scenario where no social norms were broken. The second story (presented in Table 14) proposes a scenario where a few social norms were broken, and the third story (presented in Table 15) provides a plot with multiple social norms broken.

The warrior had an accident.
 The tlatoani realized that the warrior had an accident.
 The tlatoani cured the warrior.
 The virgin mugged the tlatoani.
 The warrior killed the virgin.
 The warrior sacrificed himself.

Table 15: Story with multiple social norms broken generated by the implementation of the model.

The first questions (see Table 17) focused on the overall evaluation of interestingness for each story. The range employed was from 1 (non-interesting) to 5 (very interesting). The average evaluations obtained for each story were the following: 2.62 for story 1, 3.35 for story 2, 3.43 for story 3. Figure 16 shows these results.

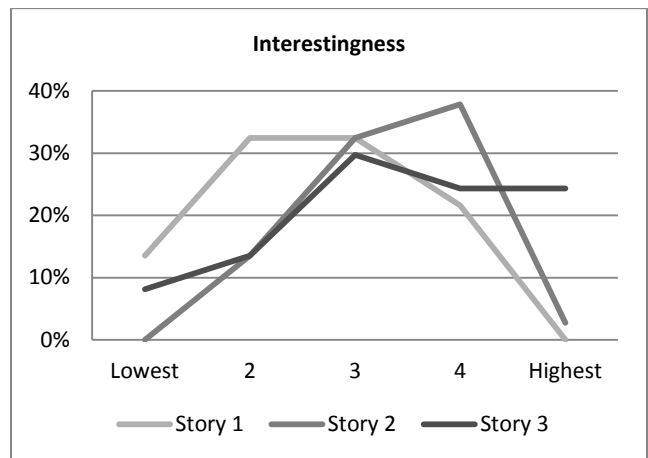


Figure 16: Results of the interestingness evaluation of the stories.

The vertical axis represents the percentage of students that selected each option displayed on the horizontal axis.

In general, how interesting was for you the first story?
 In general, how interesting was for you the second story?
 In general, how interesting was for you the third story?

Table 17: Questions for overall evaluation of interestingness.

A second group of questions (see Table 18) focused on the appreciation of social norms ruptures inside each story. Only 23% of the students identified an action that broke a social norm inside the first story, 81% identified at least one social rupture inside the second story, and 86% detected social ruptures inside the last story.

After reading the first story, which actions do you consider that break a social norm?
 After reading the second story, which actions do you consider that break a social norm?
 After reading the third story, which actions do you consider that break a social norm?

Table 18: Questions for detecting social norm ruptures.

In Figure 19, the percentages of students identifying an action breaking a social norm inside each story are presented. The vertical axis shows this percentage, and the horizontal axis represents the action number where the social rupture was detected. For the first story, no significant percentages occurred for any action. For the second story, only the last two actions presented significant results. For the third story, its last three actions were identified as representative examples of social norm breakages.

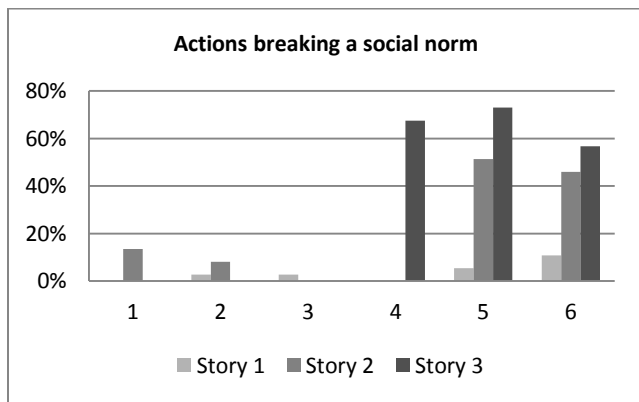


Figure 19: Percentage of students identifying a social norm rupture in an action.

Lastly, an additional question (shown in Table 20) was designed to retrieve the factors contemplated by the respondents to determine their interestingness grading. The results obtained identified that 56% of them recognized that breaking a social norm increases the interestingness of a story.

Which factors did you consider to evaluate the interestingness of a story?

Table 20: Question for determining the factors involved when evaluating the interestingness of a story.

Discussion and Conclusions

The presented values for interestingness of the stories are consistent with the social norms' hypothesis, which stated that the rupture of social norms may increase this value. Despite the fact that the overall interestingness evaluation for the last two stories is similar, the percentage of highest evaluations for the third story is significantly higher than the value obtained by the second story, which indicates that this story had the highest scores.

According to the results presented, most of the students identified the rupture of social norms in the second and third stories, which is consistent with the purpose of the questionnaire.

The implementation of our model was employed to validate our model with the actions identified by the respondents. When running the system, there were no actions identified that broke social norms for the first story; the last two actions of the second story broke a social norm because they unjustifiably introduced tensions; the last three actions of the third story broke social norms as well. These actions identified by the model are consistent with those found by the students in the survey.

We proposed a model to represent, employ and identify for social norms in narratives. To identify when a social norm is broken inside a story, two processes are proposed as part of the model. The first is based on a hypothesis presented to identify a threat to the welfare of a social group. The second consists in the identification of any generalized social context inside the story context.

The concept of unjustified actions has also been coined. When one of such actions is triggered inside a story, a social norm is considered to be broken. The procedure to identify justified actions is inspired in crime and social norm theories. An action that triggers a moderate or intense tension is considered justified when, previously in the story, another moderate or intense tension was triggered against the action performer, or against any positively linked character to the action performer, by the action receiver.

A new kind of actions, called social actions, is proposed. They emphasize the presence of a socially relevant action inside a story, and also serve as containers for evaluative clauses, which incorporate author values and valid norms within the scope of the story.

The implementation of the model has been presented to describe its operation. It introduced new computer structures to represent social knowledge and mechanisms to identify when a social norm has been broken within a narrative.

The structures described to represent the social knowledge employed by the model are social relations between characters and social contextual structures. The last structure is particularly interesting because they represent the generalization of contexts where the rupture of social norms was identified. In this way, it becomes feasible for the system to incorporate new social norms to its knowledge structures from the analysis of inspiring stories.

The results obtained from the survey as well as those retrieved from the analysis of the model of social norms seem to be aligned with the hypothesis related to the correspondence between social norms and the interestingness of a story. Additionally, when comparing the social norms detected by the model with the results from the survey, a correspondence was detected. These results suggest that the information incorporated by the model to the process of generation of narratives turns out to be valuable. Nevertheless, still additional experimentation should be performed to increase the accuracy of the model and to provide elements that can help on processes involved on the story generation and on the evaluation of the interestingness of the generated stories.

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