



# *Can Learning Analytics Help to Understand the Learning Process?*

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# Background

- Google, Amazon and Facebook created a trend to collect data from the users of the service.
- Processing and understanding the massive user data creates business intelligence. So the data is a crucial asset for these companies.
- This is how we get better search results, suggestions for music or books that might interest us etc.

# Three strands of analytics for learning


- Educational data mining focused on the technical challenge: How can we extract value from these big sets of learning-related data?
- Learning analytics focused on the educational challenge: How can we optimize opportunities for online learning?
- Academic analytics focused on the political/economic challenge: How can we substantially improve learning opportunities and educational results at national or international levels?





# Traditional data vs. Big Data


- Traditional data is structured (SQL databases, XML data). Big Data can be unstructured or multi structured (for example large amounts of Twitter text feed).


Tweets


 **Codio** @CodioHQ · Nov 25  
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Mr. Pori Jazz, Jyrki Kangas täyttää tänään 70 vuotta. Radio Pori onnittelee ensimmäistä toimitusjohtajaansa!... [fb.me/36tl4r5qv](https://fb.me/36tl4r5qv)  
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Toimistolla [@Ulkoministerio](#). Odotan porukoilta kysymyksiä perjantain avauksesta, eli "Mitä jäbä duunaa?". Kyl diplomaatit osaa. [#putous](#)

# The Use of Educational Data

- Administrative purposes
- Evaluation of activities (indicators: frequencies)
- Improving the course content (indicators: challenges in some exercises)
- Assessment (testing, automatic assessment vs. peer review)
- Providing personal support for the learner (suggesting learning topics)
- Top 5% of students in any course could be interesting group from the point of view of any company who would like to recruit new talent.
- Achieving grades from online learning.

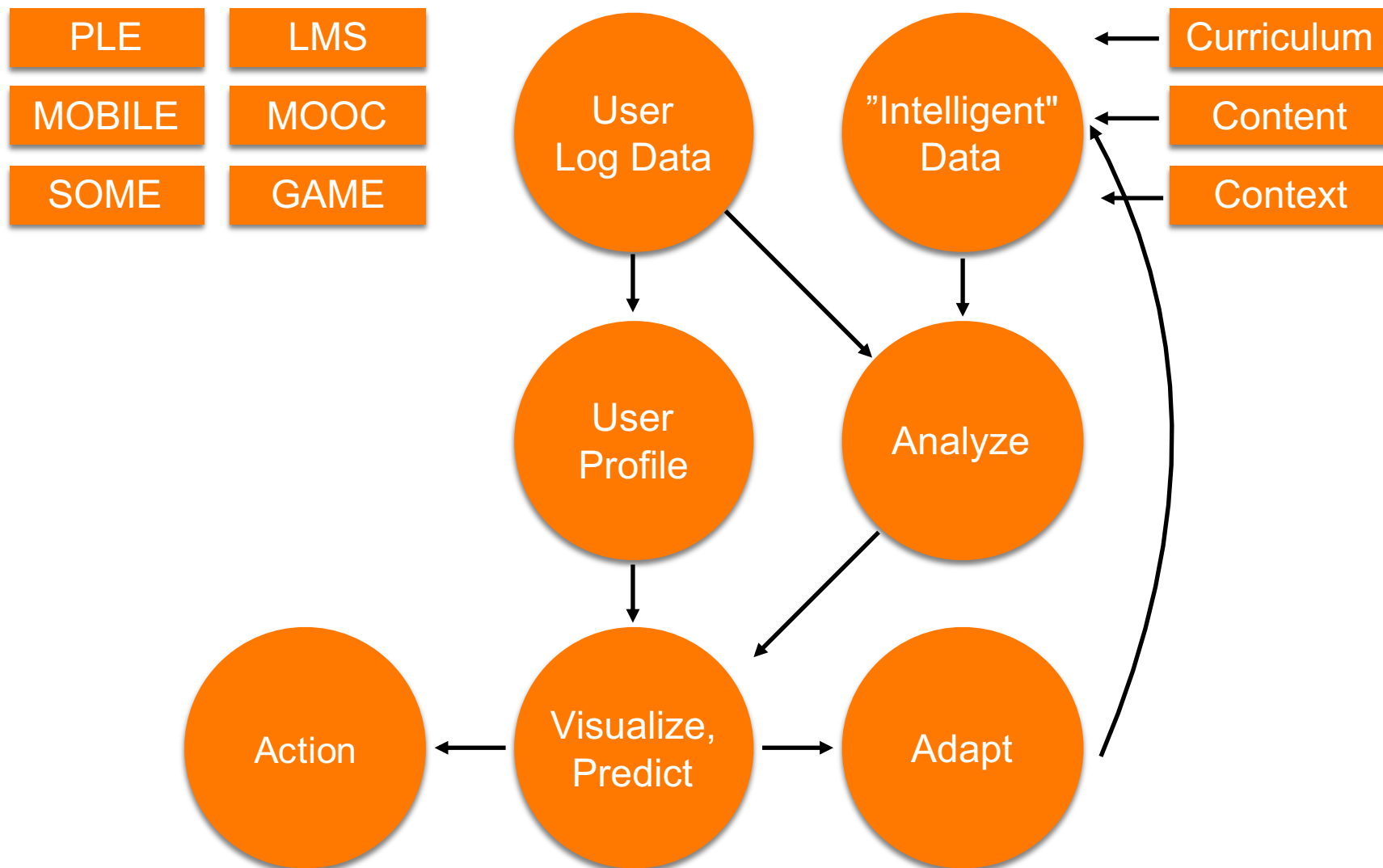
# Typical Research Areas

- Individual learning
- Computer supported collaborative learning
- Testing
- Adaptive learning environments
- Factors associated with student failure or non-retention
- Student modeling (knowledge, motivation, meta-cognition, attitudes, boredom, self-efficacy)
- Knowledge domain modeling
- Pedagogical aspects of online learning (support)
- Educational theories for online learning

# Learning Analytics

- Learning Analytics collect and analyze the traces the students leave to the learning environment (LMS, MOOC, game). Learning analytics is the big data for education.
- Aim: to find correlations between student activities and learning outcomes.
- Identify students who are likely to fail (or drop) the course.
- Identify those parts in the course that cause most difficulties to students.
- “Learning analytics is the use of intelligent data, learner-produced data, and analysis models to discover information and social connections, and to predict and advise on learning.” (Siemens, 2010).





# Data sources

- Learning environments designed for educational data collection for specific events.
- General data collection, such as web navigation data.
  - For example Google Analytics, Piwik (open source web analytics)
- As always, the quality of the data dictates the usefulness of the data - GIGO, Garbage in, Garbage out.

# Data from general tools

- *Hits*. Measures the total number of requests for text, images, etc. the web server receives for a given page.
- *Visits*. The number of visitors to a particular site or page and *time* spent at the site.
- *Unique Visitors*. The number of site visits by different users, also the rate of *new* vs. *returning visitor*.
- *Page Views*. The number of times any page was viewed by any visitor.
- *Bounce rate*. Bounce rate is the percentage of visits where the visitor left your site after viewing only one page. This metric is typically used to measure visit quality.
- *Top Entry and Exit Pages*. Refers to the pages on which most visitors enter your site.
- *Visitor Information*. The country or region, the web browser, mobile/desktop user, OS, etc. Google Analytics adds the *service provider* and *device information*.
- *Click Paths or Tracks*. Graphical representations of typical paths through the site. Google Analytics adds user defined *events*.

# MoViE

- Home
- Projects
- Stories
- Clips
- Students
- Collaboration

Welcome John!  
Let's get started

Create new project

Or add a new clip

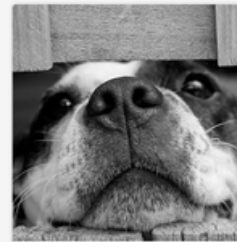
## Stories from others



Brainstorming session for...



Evening sight seeing



Pets



Cooking classes from the...



Art project second

## Open projects



Sea exploration  
📍 Helsinki, Finland



Music instruments  
📍 Spain



Nature observations  
📍 Canada



Sports  
📍 Turku, Finland



Acting  
📍 France

iPad



John

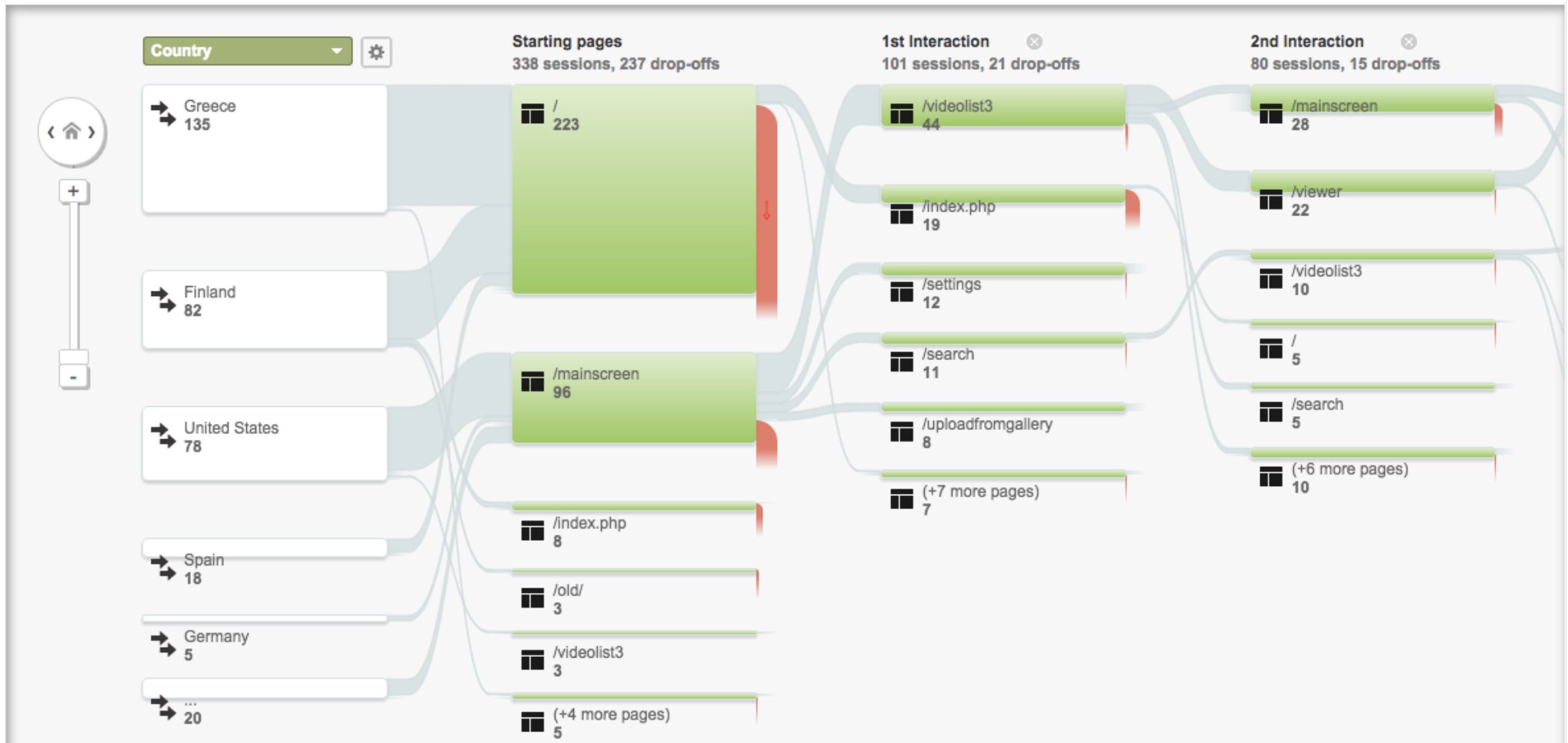
# Users Flow

May 15, 2015 - Jun 14, 2015

Level of Detail ▾ Export ▾

All Sessions  
100.00%

+ Add Segment



# Data from specific tools

- Based on the content and the activities the user can do.
- Events (for example answers to a multiple choice question, selection of a specific menu choice) that have a meaning in the *context*.
- Have to be designed as a part of the system.
  - Difficult to transfer to other systems, not easy to compare to data from other systems.



# Case: mobile video storytelling

## What do we already know related to a video clip in MoViE

- The number of comments posted (daily/weekly/monthly)
- The number of annotations added (daily/weekly/monthly)
- The number of links to video clips inside MoViE (daily/weekly/monthly)
- The number of views (daily/weekly/monthly)
- Tags, length, author, upload date, number of ratings, mean rate, number of queries, location (not in every video)
- Annotations, links inside annotations

## What can we identify from the data

- the clips that have the most annotations
- the clips that have links outside MoViE
- the clips that have the most tags/comments/ratings/views
- the authors that have the most tags/comments/ratings/views
- the authors who create the most annotations, comments
- the users that have the most video uploads (daily/weekly/monthly) inside a class/group

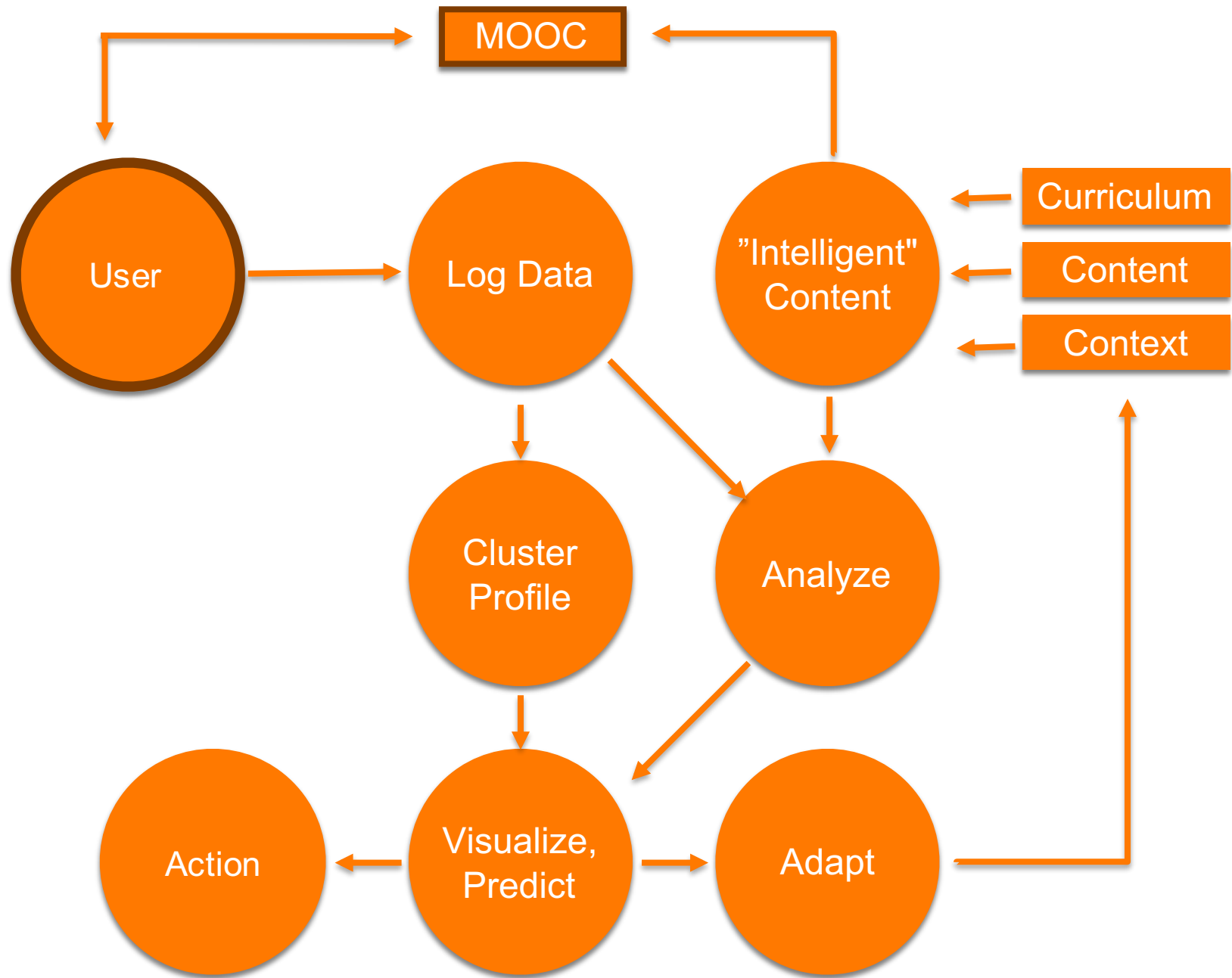
# Case: mobile video storytelling

## What do we know of a MoViE user:

- Number of uploads
- User's role (moderator i.e. teacher or normal user)
- Number of remixes
- Moderator, trusted, groups that the user belongs
- Media user has uploaded or remixed
- Remixing phase: we should save the original media id's

## We can find:

- whose clips have been used the most (most inclusions to remixes)
- the clusters of users/remixers who are using each others clips in their remixes.





A man with short brown hair, wearing a blue zip-up hoodie over a checkered shirt and light-colored trousers, is crouching on a rocky, grassy cliff. He is looking directly at the camera. In the background, the ocean waves are crashing against the base of the cliff. The sky is overcast.

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