



FamiLync: Facilitating Participatory Parental Mediation of Adolescents' Smartphone Use

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A man in a green polo shirt stands on the right, looking down at a boy in a blue shirt on the left. The boy has his arms crossed. A large white speech bubble is overlaid on the scene, containing text. The background is a bright, indoor setting with a white sofa and a window.

Son, stop using a smartphone!

You spent too much time with it.
Did you finish your homework?

Maybe,
I need to install parental control apps.

A young boy with short brown hair, wearing a blue t-shirt, stands with his arms crossed, looking up at his father. His father, wearing a light green t-shirt and blue jeans, stands with his hands on his hips, looking down at the boy. A large white speech bubble is positioned between them, containing text.

**Daddy,
you don't understand me!**

I think I didn't use it that much.
I can do my job well.

You even use it more time!
You first need to stop using the phone.



Evolution of Parental Mediation on Children's Media Use

Media

TV & Video Games

[Austin93, Valkenburg99]

Distinct

- Public places
- Shared media
- Big screens

Methods

- Restrictive mediation
- Active mediation
(e.g. discuss pros. & cons.)
- Co-viewing/Co-playing



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Methods



PC & Internet

[Livingstone08, Nikken11]

- Public/private places
- Shared/personal media
- Smaller screens

- Parental control tools
(e.g. filtering/monitoring) **new**
- Active co-use **new**



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[Austin93, Valkenburg99]

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(e.g. filtering/monitoring)
- Active co-use



Methods

Smart Devices (e.g., Smartphone)

[Haddon13, Clark12, Yardi11, Ito10]

- Mobile/Portable
- Personal media
- Very small screens

- Remote control apps
(e.g. locking/monitoring) new
- Collaborative
[Participatory] new
parental mediation



Evolution of Parental Mediation on Children's Media Use

Media

TV
& Video Games

[Austin93, Valkenburg99]

PC
& Internet

[Livingstone08, Nikken11]

Smart Devices
(e.g., Smartphone)

[Haddon13, Clark12, Yardi11, Ito10]

ESPECIALLY,

“Collaborative approach” have been
effective in diverse domains

Methods

- Active mediation
(e.g., discuss pros. & cons.)
- Co-viewing/Co-playing

- Active co-use

- Collaborative
[Participatory]
parental mediation

Helpful in balancing

“parental control” and **“child autonomy”**



Collaborative Parental Mediation on Media Use in HCI

- Along with media device change, HCI researchers have **investigated the complex nature of parental mediation** and also attempted to **design new computational supports for collaborative parental mediation**
 - ✓ Tablet PC: Involving children in content control [Hashish14]
 - ✓ Social media: *family window*, social translucence for family [Yardi11]



<WeChoose: Involving children in content control>

BUT, many parents are relying on **restrictive methods** that often cause **conflicts with their child**



“**77.1%** have **concerns** about their child’s smartphone use (e.g. distraction in studying)”

“**78.1%** have mediated the child use, and they mostly use **restrictive methods**”

To enforce restrictive rules (e.g. limiting Time of day, total amount of usage time)

- Verbal instructions
 - Physical separation (e.g., putting a phone in a public space)
 - Parental apps (mostly supporting restrictive function, e.g. locking, monitoring)
- Open-coding analysis results

“**69.5%** have had **conflicts** with their children due to smartphone use”

Smartphone's "diverse utilities" and "personal/portable nature" make parents difficult in enabling effective parental mediation

- "Shared understandings based on *co-activity*" are a basis of collaborative approach [Clark12] (□ e.g., limiting smartphone use together)
- However, co-limiting smartphone use is more challenging due to smartphone's diverse utilities and personal/portable nature as follows:



Various usage needs
in diverse contexts



**Lack of self-regulation
(even, parents)**



Personal and portable nature
of smartphones



**Lack of awareness
on smartphone
usage**

We designed **FamiLync**, a “participatory” parenting app

Lack of
self-regulation
(even, parents)



Family activities of use limiting

- Self-monitoring one’s usage
- Trying to self-regulate usage

&

Lack of awareness
on smartphone
usage



Family awareness of usage and limiting

- Awareness on usage and limiting information



Design of Familync

Iterative Design Process

- Several rounds of a low fidelity paper prototype tests
- One round of a high fidelity prototype test with four families(n=11)
 - Focus group interview results were used for prototype refinement



Preliminary study
(n=105)
+
Literature survey



Prototype design
& tests



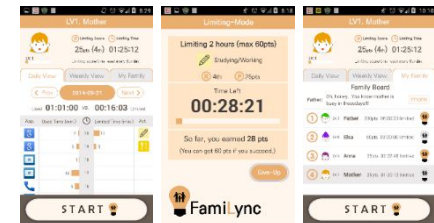
Pilot study
(n=11)



Prototype
refinement



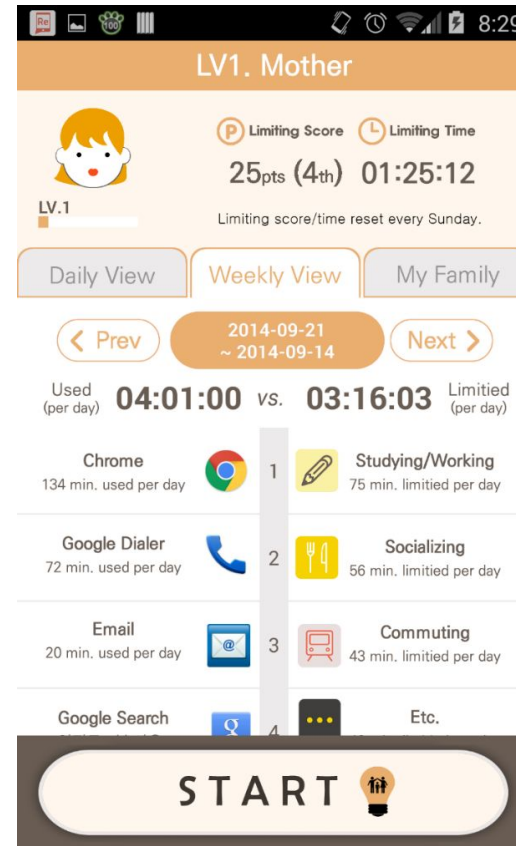
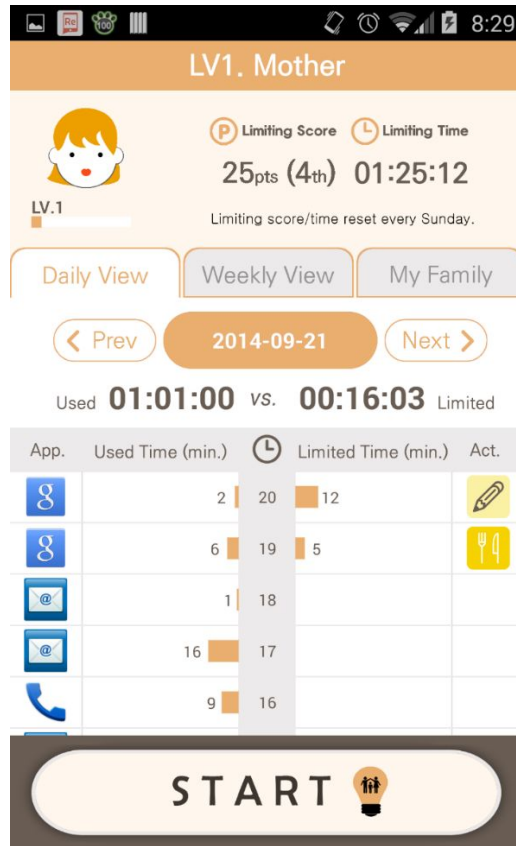
Main study
(n=35)





Design of Familync

1) Enabling family activities of use limiting



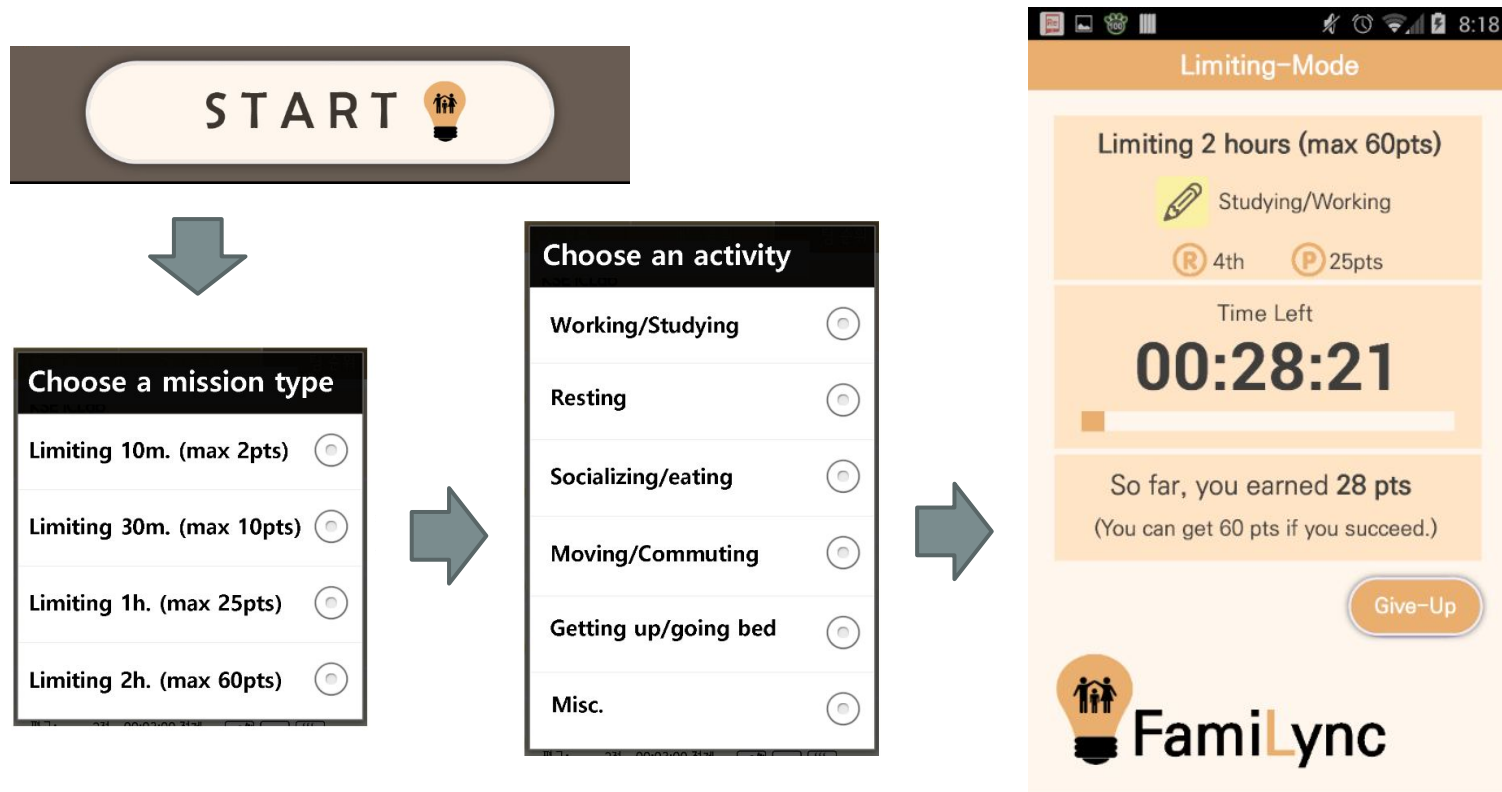
Self-monitoring [Oinas-Kukkonen09]

: Comparative view of limiting and usage behaviors



Design of FamiLync

1) Enabling family activities of use limiting



Goal-setting and assisting the limiting behavior
(Locking screen & enabling the silence mode [Ko15])



Design of Familync

2) Family awareness of usage and limiting

LV1. Mother

Limiting Score: 25pts (4th) | Limiting Time: 01:25:12

Limiting score/time reset every Sunday.

Family Board

Father: Oh, honey...You know mother is busy in thesedays!!!

| Rank | Profile | Score | Time | Status |
|------|-------------|--------|----------|---------|
| 1 | LV.7 Father | 200pts | 06:00:00 | limited |
| 2 | LV.6 Elsa | 60pts | 03:00:00 | limited |
| 3 | LV.5 Anna | 35pts | 02:07:48 | limited |
| 4 | LV.1 Mother | 25pts | 01:25:12 | limited |

START

LV.5 Anna

Limiting Score: 35pts (3th) | Limiting Time: 02:07:48

Limiting score/time reset every Sunday.

Used **03:12:15** vs. **02:07:48** Limited

| App. | Used Time (min.) | Limited Time (min.) | Act. |
|----------------|------------------|---------------------|------|
| Clash of Clans | 24 | 20 | |
| Clash of Clans | 24 | 19 | 14 |
| Chrome | 30 | 18 | 10 |
| Facebook | 22 | 13 | |
| Chrome | 11 | 16 | 47 |
| Mail | 5 | 15 | 46 |

Close

Clash of Clans
Supercell

INSTALL

50 MILLION Downloads | 4.6 (6,600,796 users) | Strategy | Similar

Epic combat strategy game. Build your village, train your troops & go to battle!

READ MORE

Family dashboard to share usage and limiting information
(implement social translucence [Yardi11])



Design of Familync

2) Family awareness of usage and limiting

LV1. Mother

Limiting Score 25pts (4th) Limiting Time 01:25:12

LV.1 Limiting score/time reset every Sunday.

Daily View Weekly View My Family

Family Board

Father: Oh, honey...You know mother is busy in thesedays!!!

1 Father LV.7 200pts 06:00:00 limited

2 Elsa LV.6 60pts 03:00:00 limited

3 Anna LV.5 35pts 02:07:48 limited

4 Mother LV.1 25pts 01:25:12 limited

START



Family Board

Leave messages to encourage each other :)

Mother Our family are doing good job!!!!!!

2014-09-21 20:30:05

Anna Thank you, Mommy!!!!

2014-09-21 20:32:05

Elsa Mommy, you should try more !!!!

2014-09-21 20:43:05

Father Oh, honey...You know mother is busy in thesedays!!!

2014-09-21 20:48:05

Post

Family board to facilitate family communications

Evaluation of FamiLync

Q1: FamiLync improves **parental mediation style** on smartphone use?

- Participatory mediation has known as balancing parents' control (i.e. **demanding**) and child's autonomy (i.e. **responsive**) [Clark12].
- We used the customized *Korean Parental Authority Scale* [Lee08]

Q2: FamiLync improves **communication** between parents and child?

- Communication between parents and child is a basis of collaborative parental mediation [Hashish14, Clark12].
- We used the *Parent-Adolescent Communication Scale for Koreans* [Min02]

Q2: FamiLync decreases **smartphone usage amount**?

- We analyzed smartphone usage log data (usage time, frequency).

All the data were **statistically** analyzed by **comparing before/after** FamiLync use.

Also, the quantitative results were supplemented by **exit-interview data**.

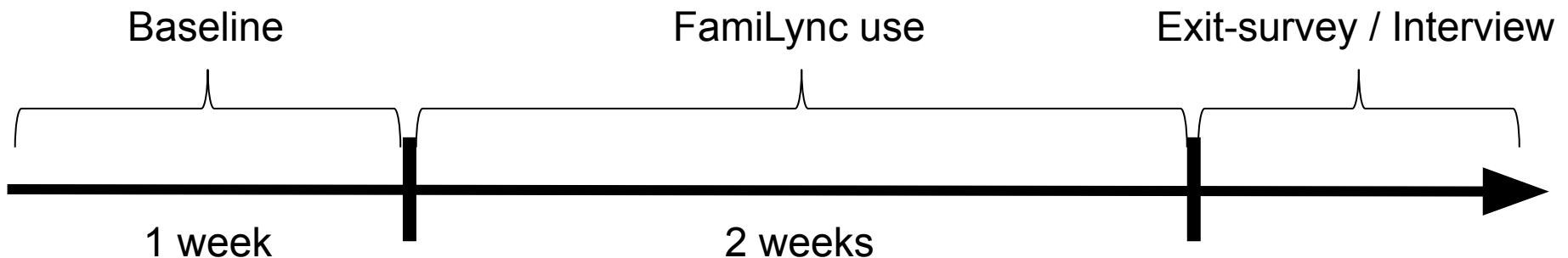
Experimental Setup

Method: In-situ deployment study (within-subjects)

Participants: Twelve families who have a teen(s) in Korea (n=35)

- Introduced by teachers in a high school and received additional requests
- 17 Parents: 11 mothers and 6 fathers whose average age was 47.65 (SD = 4.55)
- 18 Children: 14 boys and 4 girls whose average age was 16.39 (SD = 1.50)

Duration: total three weeks + exit-interview



(1) Parental Mediation Style on Smartphone Use

Two tailed t-test results on “Customized Parental Authority Questionnaire”

Permissive (undemanding)

“I seldom gave my child expectations and guidelines for my child’s smartphone use.”

 **Parent**  **Child**



N/S


N/S

Authoritarian (unresponsive, but demanding)

“I let my children know what behavior I expected of them regarding smartphone use and if those expectations were not met they were punished.”


N/S


Decreased
($p < 0.05$)

Authoritative (responsive and demanding)

“I consistently gave my child direction and guidance in rational and objective ways regarding smartphone use.”

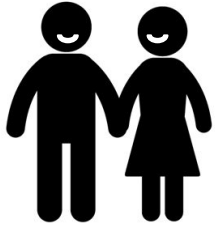

Increased
($p < 0.05$)


Increased
($p < 0.05$)

(1) Parental Mediation Style on Smartphone Use

Exit-Interview results

Less restrictive and enjoyable parenting



Parent

[Parent 12] “Now, I knew why my son was stressed out whenever I asked him to stop using his phone. I think I should consider the context of my son’s usage when I try to regulate it.”

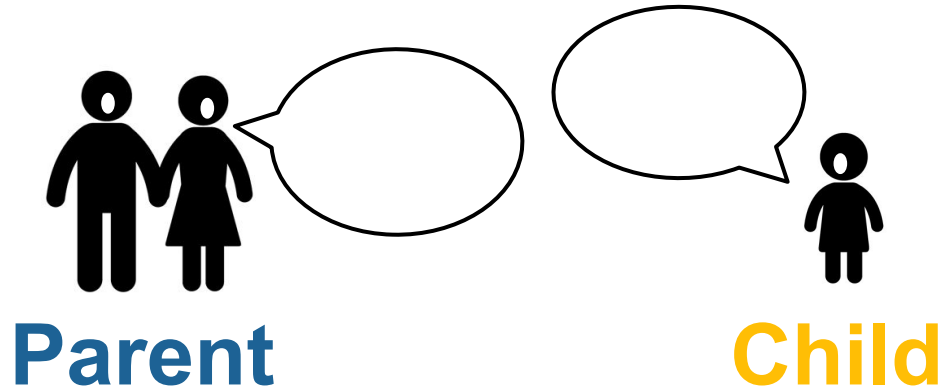
[Child 4] “I was shocked about my father’s limiting scores because I did not expect him to be able to do that. So, I felt I also had to limit my use.”



Child

(2) Communication between Parents and Child

Two tailed t-test results on “*Parent-Adolescent Communication Scale for Koreans*”



Improved
($p < 0.05$)

Before: 47.24 pts
After : 53.76 pts



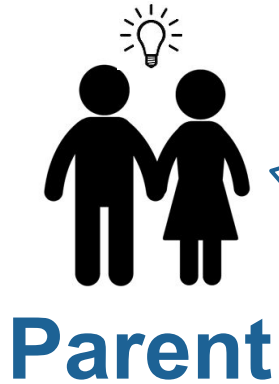
Improved
($p < 0.05$)

Before: 45.72 pts
After : 54.67 pts

(2) Communication between Parents and Child

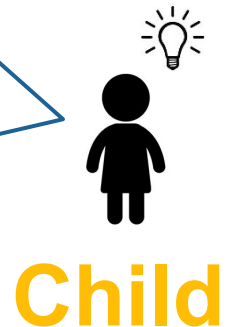
Exit-Interview results

Communication based on better understandings



[Parent 3] “I found that my child did not use the phone as much as I thought he/she did.”

[Child 1] “My parent and I had a discussion about each other’s app usage. We had a conversation about which apps were useful or harmful.”



(2) Communication between Parents and Child

Exit-Interview results

Facilitated parent-child interactions

- Online interaction between parents and children
- Long-distance parenting

[Child 5]

“I think our family atmosphere has become better with this app. My father really limits his use strongly. I believe that it is his effort to show his love for me.”

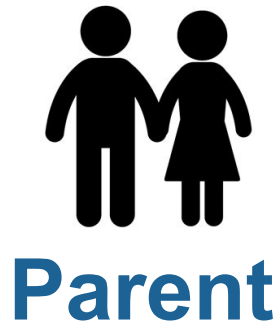


Child



(3) Smartphone Usage Amount

Two-tailed t-test on smartphone usage log data



Usage time



Decreased
($p < 0.05$)

Before: 164.76 min.
After : 135.08 min.

Usage frequency



Decreased
($p < 0.05$)

Before: 75.38 times
After : 66.20 times



Decreased
($p < 0.05$)

Before: 188.89 min.
After : 149.84 min.



Decreased
($p < 0.05$)

Before: 118.78 times
After : 95.48 times

* All the figures represent the average of usage amount 'per day'

Conclusion

Enabling Participatory Parental Mediation on Smartphone Use

- Although prior studies in parenting/HCI areas have addressed the needs of collaborative parental mediation in the digital age, many parents are still relying on restrictive mediation on smartphone use that often causes conflicts with their children.
- FamiLync is the first try to enable participatory parental mediation on smartphone use by considering the contextual nature of smartphone use that obstacles parental mediation.

In-situ deployment study to evaluate FamiLync

- We evaluated FamiLync by in-situ deployment study, and found (1) perceived parental mediation style became demanding and responsive, (2) communication between parent and child was improved, (3) smartphone usage amount decreased.
- This is just a baby step for participatory parental mediation on smartphone use, so further studies need to be conducted by a long-term study with a larger scale.

HCI Studies on Side Effects of New Technology: Addiction, Overuse

- Various ubiquitous technologies sometimes cause side effects such as overuse.
- Our study addresses that it has become important to investigate how to help people be in harmony with these new ubiquitous technologies.



Thank you!

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